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PLANNING REPORT

FOR THE PROPOSED

MISSOURI BREAKS

NATIONAL LAND MANAGEMENT AREA

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DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

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DEPARTMENT OF THE INTERIOR

BUREAU OF LAND MANAGEMENT

The following report has been prepared by the Montana State Office of the Bureau of Land Management in cooperation with the Bureau's Missouri Basin Field Committee Representative. The recommendations contained herein may be given further consideration by the Bureau's Director after he reviews other agency proposals and when the entire Upper Missouri River Study is being reviewed at the Departmental level.

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TABLE OF CONTENTS

Page No.

Summary and Recommendations 1

Part I - General 6
- The Missouri River 7
- Development of the Present Pattern of Economic Activity 7
- The Present Economic Base 14
- Economic Trends 22

Part II - The Missouri Breaks Study Area 25
- Delineation of Study Area Boundary 26
- Geology 26
- Climate 28
- Soils 29
- Land Status and Owners 31
- Natural Resources, Their Use and Administration 33
- Recreation 48
- Study Area Problems 53

Part III - Proposed Bureau of Land Management Action 57
- Land Tenure Adjustment 58
- Resource Management and Development 59
- Recreation Management and Development 61

Part IV - Other Agency Proposals and Their Effect Upon the Bureau of Land Management's Proposal 65

SUMMARY AND RECOMMENDATIONS

Summary

The Missouri Breaks area lying on both sides of the Missouri River between the upper end of Fort Peck Lake and the Judith River embraces one of the last remaining undeveloped stretches of the Missouri River. It is the only such area which is predominantly under Federal ownership.

The resources in this locality are now being evaluated to determine the feasibility of a national wilderness waterway, a series of power and flood control reservoirs, a single use wildlife area, or various combinations of these. As the principal land administrator in this area, BLM has many operating programs which will be affected in varying degrees by the developments proposed.

This study was made to evaluate the area's land-based resources and their potential. The Bureau presently has management programs operating in this area. This study reviews these programs and indicates additional needs for the proper tenure adjustment, use, and development of the approximately one million acres of national land reserve and land utilization lands which are most directly involved.

The study falls into several parts. Part I is a general discussion of the Missouri River Basin, the Missouri River itself, and the economic history and status of the five Montana counties directly affected. Part II is a detailed treatment of a selected study area within which the national land reserve has a dominant role. Within this selected study area, BLM administers fifty percent of the surface, sharing this administration with the Bureau of Sport Fisheries and Wildlife for the acreage within the Fort Peck Game Range. Part III outlines BLM action which appears necessary for the detailed study area, and Part IV discusses other agency plans for this locality, insofar as they conflict with the BLM proposals.

The breaks area has a fascinating history. It was traversed by the Lewis and Clark exploration party. The river was used as a main artery of commerce during the gold rush days in Montana. Later the river transportation was abandoned as railroads came into the state. At one time, the breaks were a refuge for outlaws. They are just now being rediscovered as an area of potential recreational use.

The economy of the five-county area is stationary. Neither personal income nor population growth is keeping up the national average. Hope for alleviating this situation rests with uses or development of resources not now taking place.

The following amounts of money were spent in Montana directly as a result of the use of study area resources during 1960. This is only one of many ways in which the various uses of these resources can be economically measured but gives a reasonable comparison between the various existing uses.

Beef	$2,750,000	(Value of Product Sold)
Sheep and Wool	140,000	(Value of Product Sold)
Crops	500,000	(Value of Product Sold)
Hunting and Fishing	1,275,000	(Money spent by sportsmen in use of the study area)
TOTAL	$4,685,000	

The ownership of land in the study area is diverse, with a resulting fragmented and complex ownership pattern. Acreage in the study area, by tenure, is as follows:

Public Domain Lands	940,340
Land Utilization Proj. Acq. Lands	57,270
State	115,360
Private	732,310
Defense Department	14,000
Indian	7,440
TOTAL	1,866,720

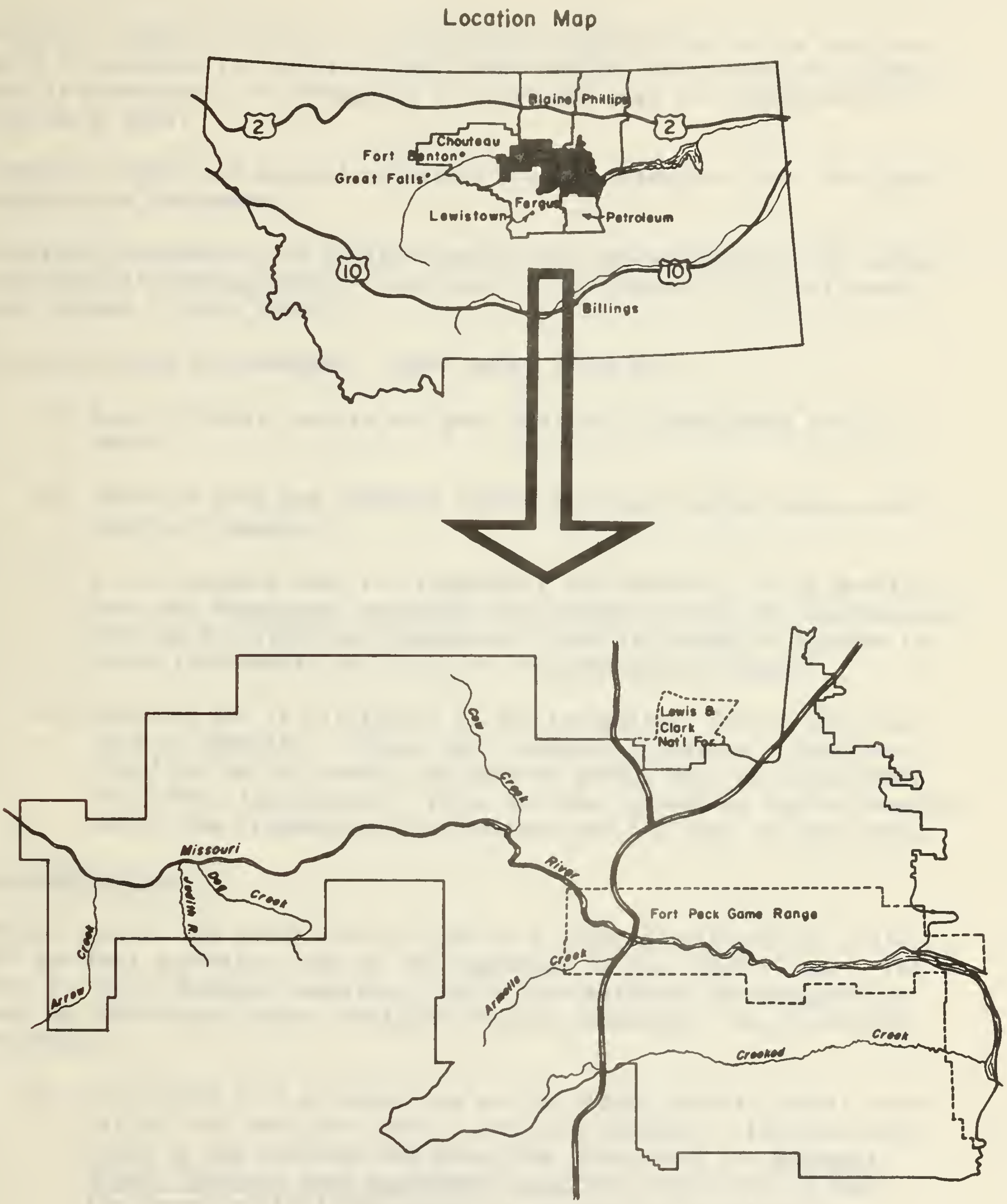
Livestock and agricultural production appear to have just about reached their potential. Substantial increases in economic returns to the community are thought possible through increased recreational use of the area, principally hunting, boating, and sightseeing. Also, an increasing demand for recreation and hunting areas from growing populations elsewhere in the nation will require additional public use areas such as this.

The Bureau of Land Management is presently engaged in an active resource management program on the public lands within the study area. In the field of forage management, all of the area north of the river and twelve percent of the operator's lands south of the river are adjudicated under the Taylor Grazing Act.

The latest range condition and trend studies show the following:

	Good	Fair	Poor	Waste	Not Yet Studied
North of the River	35.9%	50.2%	.2%	5.2%	8.5%
South of the River	39.0%	51.0%	.9%	1.0%	----

Range improvement work in the form of stock water development, fencing, reseeding, etc., has gone forward and 563 separate projects have been completed.



MISSOURI BREAKS STUDY AREA

Wildlife forage has been set aside in the adjudication of the area and will be reserved for wildlife use. Fire control activities are carried out as necessary. An average of 10 fires per year are suppressed in the study area.

Although timber and mineral materials are not extensive, they are given appropriate management.

Watershed management and erosion control are accomplished to the extent possible with appropriations available to the Bureau. Critical needs are evident in this field.

The study area has problems. Chief among these are:

(1) Lack of public access and poor quality of roads when they do exist.

(2) Unstable soil and tendency toward critical erosion unless very carefully managed.

(3) A land pattern that is fragmentary and confused. Many development and management programs are stymied because of insufficient acreage for efficient operation. This is as much a problem for other land owners as it is for the Federal Government.

(4) Balanced use is difficult, if not impossible, due to the area's lack of identity. People don't realize it exists. Since no signs are on the roads, the general public does not know where the public land begins. This, in turn, cannot be easily remedied due to the fragmentary land pattern and the lack of good roads.

Recommendations

Public land in the study area is used on a limited multiple use basis. Its greatest potential lies in the expansion of this type of use. The land is now in Federal ownership, and a true multiple use program can best be implemented under continued Federal ownership. We, therefore, recommend:

(1) To achieve full multiple use and to obtain general public recognition, the area must have a name and boundary. The area outlined on the attached map should be designated the Missouri Breaks National Land Management Area and publicized as such. The Bureau of Land Management is capable and desirous of continuing its administration of this area under the guidelines presented as recommendations 2 - 5.

The area involved contains these acreages:

	Acres	Percent of Total
Public Domain Land	925,510	60.3
Util. Proj. (BLM Admin)	52,910	3.8
State	102,800	6.6
Private	429,350	28.0
Other	21,280	1.3
TOTAL	1,531,850	100.0

(2) To simplify and improve the land tenure pattern, a program of land exchanges is required. These can be consummated under existing BLM authority, and this program is already under way. The principal objective would be to achieve solid federal ownership in the rougher breaks areas where the above-stated problems are most severe and where commercial production potential is lowest. Areas of high quality lands with lesser public management problems and minimum public values could go to private ownership.

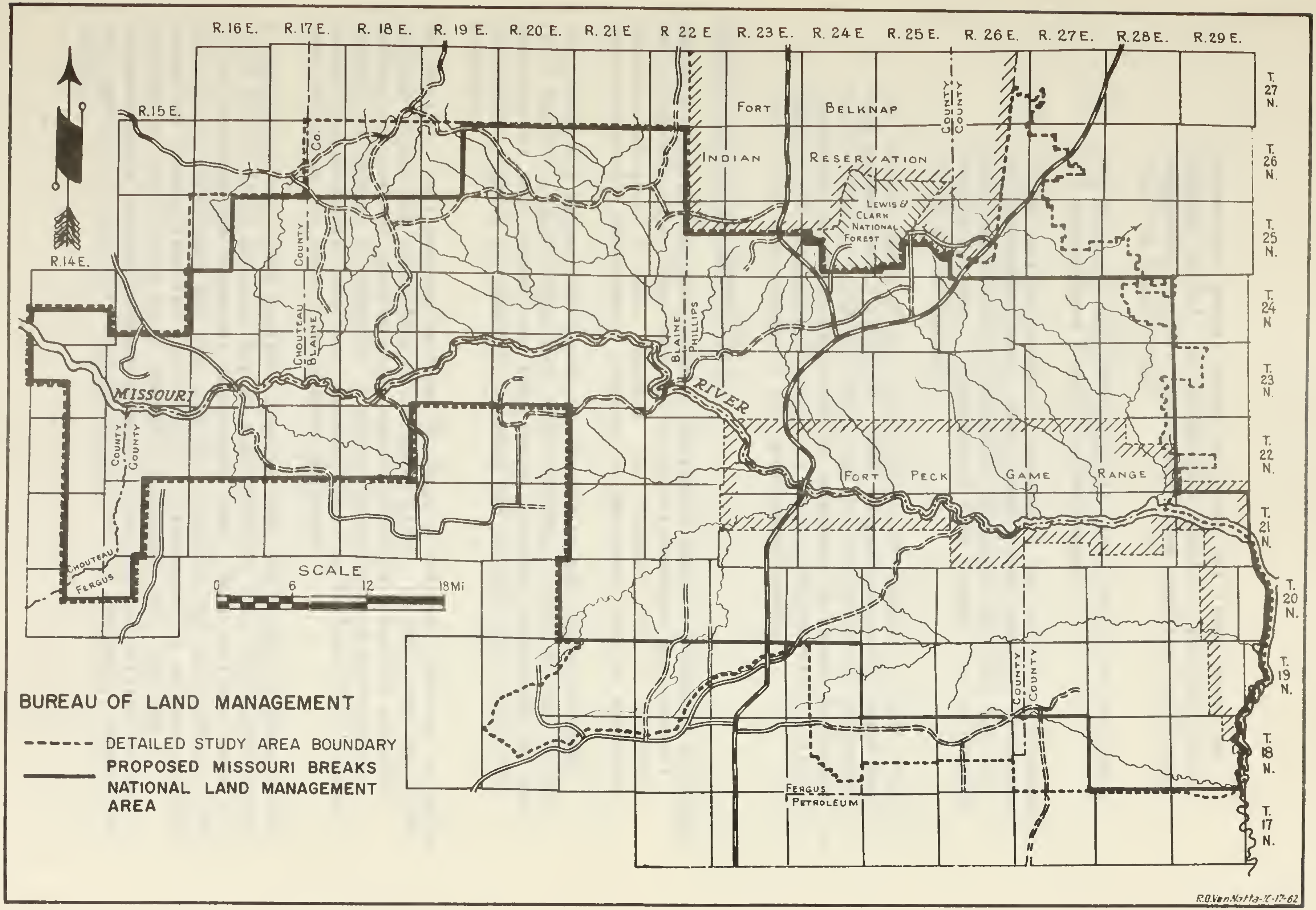
(3) Existing withdrawals should be closely reviewed and revoked if no longer necessary.

(4) Resource management (forage, timber, watershed) should be intensified. Principal needs are in the fields of range adjudication, range survey and condition analysis, construction of stock water facilities and allotment fences, construction of watershed protection facilities and general purpose access roads, reseeding depleted range areas and fire control. The objective will be to achieve an optimum balance between wildlife and domestic livestock which will contribute the greatest return to the local economy, the state, and the nation. This may require reduction in existing livestock use.

These actions can be taken under existing Bureau authority and are now well under way. An estimated $4,000,000 is required to construct the needed facilities. The proposed access road network is shown on the attached map.

(5) Recreation management and development is urgently needed to provide for multiple use of the area. Principal recreation use would be in the form of float trips and fishing on the river or reservoirs, hunting on the upland areas, and general observation of the area's scenic attractions. In the event that no reservoirs will be constructed and that the area is not found suitable for a National Wilderness Waterway, the following is proposed (see attached map):

(a) Two major park areas should be established, one at the mouth of the Judith River and the other on the Musselshell River. The James Kipp State Park at the Robinson Bridge crossing should be expanded. These parks would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T. 24 N
T. 23 N.
T. 22 N.
T. 21 N.
T. 20 N.
T. 19 N.
T. 18 N.
T. 17 N.
FORT BELKNAP INDIAN RESERVATION
LEWIS & CLARK NATIONAL FOREST
COUNTY
COUNTY
CO.
CHOUTEAU
BLAINE
BLAINE
PHILLIPS
MISSOURI
RIVER
FORT PECK GAME RANGE
CHOUTEAU
FERGUS
FERGUS
PETROLEUM
SCALE
0
6
12
18Mi
BUREAU OF LAND MANAGEMENT
DETAILED STUDY AREA BOUNDARY
PROPOSED MISSOURI BREAKS NATIONAL LAND MANAGEMENT AREA
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accommodate people using the river for float trips and fishing, as well as the general tourist. Trailer stalls, campgrounds, picnic sites, and other required facilities should be constructed.

(b) Four historic and archeological sites should be developed with appropriate facilities and access.

(c) A sign posting program is necessary for the entire proposed land management area. The signs should identify boundaries, give directions and generally interpret the area for the average citizen. Interpretive maps should also be printed for this same purpose.

The initial stage of the recreational development proposed would cost approximately $170,000. This expenditure would prive minimum facilities to permit people to use the available resources. Additional expenditures would be necessary as demand increases, to improve the established sites, to develop additional facilities, and to pay administrative and maintenance costs.

Conflict with Other Agency Plans

Bureau of Reclamation and Corps of Engineers dam and reservoir proposals would eliminate the float trip and river bottom-based recreational proposals advanced by BLM. However, the alternate type of reservoir-based recreation development proposed by BLM could then be achieved.

The Geological Survey and Bureau of Mine's findings for their study areas may not seem to agree with BLM's findings. This is due to the selection of study areas, and the mineral potential discussed by these two agency reports is generally outside the BLM detailed study area boundary.

The National Park Service National Wilderness Waterway proposal is quite similar to the BLM recreation development plan. If the river truly has national historical significance, the National Park Service proposal should, of course, be adopted. A minor but irritating problem may result from domestic livestock breaking into the National Park Service area to get to the river for watering purposes.

A substantial and basic conflict appears with the Bureau of Sport Fisheries and Wildlife proposal for a large wildlife area, encompassing most of the proposed BLM intensive management area. This conflict seems to be entirely based upon the two agencies' concepts and philosophies. The Bureau of Sports Fisheries and Wildlife is recommending optimum wildlife production, with little or no domestic livestock use. The BLM is recommending a balance between domestic livestock and wildlife which will provide the greatest economic returns to the community, state, and nation.

MISSOURI BREAKS

Roy, Montana
Typical Community
in Breaks Vicinity

Existing
Undeveloped
Access Trail

[illegible]
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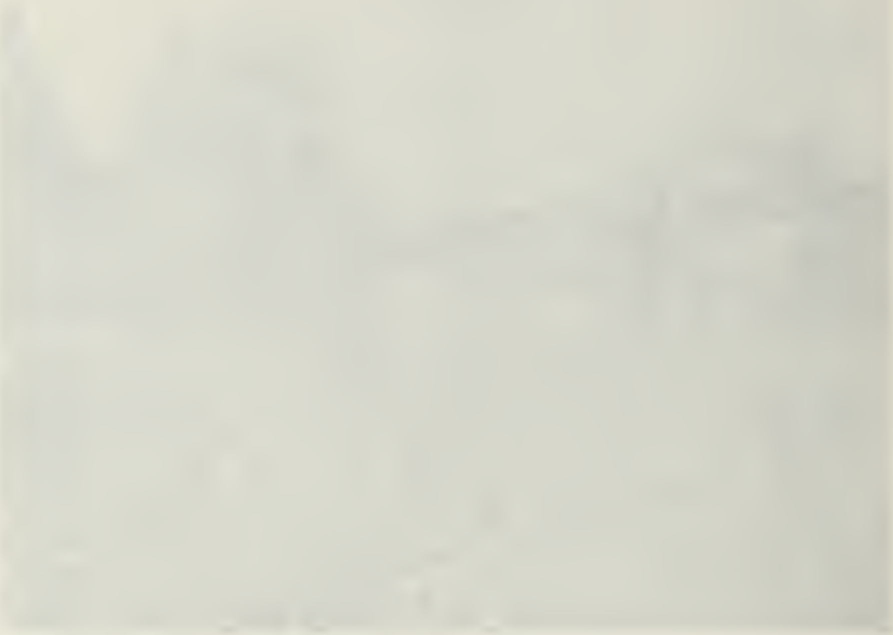

[illegible]
[illegible]
[illegible]

Resources - Timber, Wildlife, Cattle, Sheep

[illegible]

Views Illustrating Erosion -- Pictures on right are examples of scenery that may be observed when "floating" the Missouri River

PART I - GENERAL

THE MISSOURI RIVER

DEVELOPMENT OF THE PRESENT PATTERNS OF ECONOMIC ACTIVITY

- Exploration, Fur Trade, and Indian Trouble
- The Gold Frontier
- Agriculture
    - Livestock
    - Dryland Grain
    - The Effects of Climatic and Financial Cycles
    - Water Resources
    - Transportation and Communication

THE PRESENT ECONOMIC BASE

- Population
- Agriculture
- Manufacturing
- Mining
- Service Industries, Retail and Wholesale Trade
- Transportation and Communications
- Power and Fuel
- Recreation
- Fish and Wildlife
- Employment and Income

ECONOMIC TRENDS

- Projection of Economic Activity
- Needs
- Potential Without River Development

PART I - GENERAL

THE MISSOURI RIVER

The Missouri River Basin is a 529,000 square mile region, 1300 miles long, 700 miles wide, comprising one-sixth of the United States. It includes portions of Montana, Idaho, Wyoming, Colorado, Kansas, Missouri, Iowa, Minnesota, North and South Dakota, and Nebraska. Within this vast region lies the nation's longest river - the Missouri. This 2,460-mile river starts its seaward journey near Three Forks, in southwestern Montana, where the Jefferson, Madison, and Gallatin Rivers join. Flowing north to Fort Benton, the Missouri turns east 400 miles to Garrison, North Dakota, then southeast to Kansas City where it again turns east to cross the State of Missouri to its confluence with the Mississippi at St. Louis. Over this course, the elevation of the river ranges from 4000 feet above sea level at Three Forks to 400 feet at the mouth, and the slope varies from 5 feet per mile to only 7/10 of a foot per mile.

DEVELOPMENT OF THE PRESENT PATTERNS OF ECONOMIC ACTIVITY

The balance of Part I is material prepared by Dr. Arnold Bolle for use in the Departmental report. It is repeated intact in this report since it, (a) gives an independent picture of the geographical area involved, and (b) sets the stage for the proposals advanced by the Bureau of Land Management. It is recognized that the reader studying the entire Departmental report will have this material available elsewhere. However, some readers will see only the BLM report, and this material is placed here for their benefit.

Exploration, Fur Trade and Indian Trouble

While early exploration and the fur trade era developed normally in this area, as outlined in the National Park Service report, north central Montana was one of the last areas of the United States to be settled. The Missouri River was the most important artery of transportation for the fur trade era. Fort Benton became the center of the fur trade in the upper Missouri and later in the early gold rush days, but the land areas adjacent to the river were little affected by this activity. The westward movement of settlement originally leap-frogged the arid plains and Rocky Mountains. Wagon trains were crossing the Oregon Trail long before the settlement of the Great Plains. The gold rush to California preceded by a decade the gold mining activities in the Rocky Mountains. When this area was settled, immigration was from west to east, as a backwash of the earlier westward movement. There were two basic reasons for this delayed development. One was the severity of the climate - the dry climate and the severe winters - the other was the ferocity of the Indian tribes.

Increasing pressure of advancing settlement pushed the Indian tribes westward. The Great Plains became their last stronghold. The Sioux tribes resisted settlement northward from the Oregon Trail, the Blackfeet and related tribes resisted settlement in the upper Missouri. Isaac Stevens' Treaty with the Blackfeet, Piegans, Gros Ventre and Assiniboine tribes at the mouth of the Judith River in 1855 set aside as Indian Reservation all the land east of the Sun River, north of the Missouri River and south of the Missouri River east of the Musselshell. The land south of the Missouri, west of the Musselshell was designated a hunting area for the Blackfeet. In 1868, because of continuing trouble with the Indians, the Bozeman Trail which had provided a temporary route for settlers was abandoned and the area in Montana and Wyoming east of the Big Horn Mountains and south of the Yellowstone was established as an Indian Reservation for the Sioux and other tribes. As a result of these treaties, almost all of eastern Montana was closed to settlement and migration into Montana from the East was brought to a standstill. The Federal Government withdrew its protection for settlers in this area. Several early forts were established along the Missouri and in western Montana to protect river traffic and early settlers in western Montana. Indian troubles reached their peak with the Custer massacre in 1876. In the campaign of reprisals which followed, the power of the Indians was broken. The expedition of Chief Joseph and his Nez Perces and his final defeat and capture in the Bear Paw Mountains in this area brought to an end the era of Indian opposition on a large scale. But Indians continued to roam north central Montana and obstruct settlement as long as buffalo remained.

It has been established that six million buffalo roamed the plains of eastern Montana in 1870. They are the staple basis of the Indian economy. By 1883 they had been almost completely annihilated. During the period 1881-1883, traffic in buffalo hides down the Missouri was at its peak. By 1881 buffalo were becoming scarce on the Indian reservation so the Blackfeet and related tribes were hunting south of the Missouri and Musselshell on land on which they still claimed some rights and where buffalo remained. Settlers had started to move into this area and the Indians took a heavy toll of cattle. Cattle associations sent out bands of riders and escorted the Indians back to their reservation. By 1883-4 the Indians were without means of subsistence and many starved. From this time on, there were no more hunting bands.

Settlement was moving into the area from the west as rapidly as Indian resistance permitted. It was spurred by the discovering of gold as well as the invasion of cattle and sheep men.

The Gold Frontier

Settlement of western Montana started with the discovery of gold at Bannack in Grasshopper Gulch in 1862. The discovery was made by unsuccessful California prospectors who had drifted in from the west still

Pursuing their dreams of riches. Activity spread to Alder Gulch where Virginia City became the mining center. Gold exploration quickly covered most of the mountains and valleys of western Montana. Fort Benton became the early supply center for western Montana. By 1879, gold activities, particularly of the small prospectors, had come to an end in western Montana. Prospectors pushed eastward into the mountains of north central Montana. The Big Belts, Little Belts, Judiths, Moccasins, Little Rockies and Bear Paws became the center of activity. Gold was first discovered in the summer of 1879 in the North Fork of the Yogo, a small stream in the southeastern Little Belts. By fall of that year, more than 400 men, mostly from Helena, Bozeman, and Fort Benton, were working the stream. The following year the number had risen to about 1500 people. By 1883 the area was nearly deserted. But new discoveries in the Judith Mountains centering around Maiden Gulch brought in new waves of miners. Early discoveries were placer gold, but placers were soon worked out and were often impracticable for lack of water. Hard rock mining became the basis for a gold mining boom in the area. Local capital was scarce so the hard rock activity was financed by outside capital from Butte, Helena, and other western communities but most of it came from the East and Midwest. By 1912, gold mining activities had come to an end and now represent only a minor activity of the economy. A number of the early miners homesteaded land and turned to farming or ranching when the mines shut down. Others left the area.

Agriculture

Livestock

(1) Cattle - Except for a few small ranches in the vicinity of Fort Benton, there were no ranches in the area until the late 1870's. The first ranches appeared on the small streams of the upper Judith and Musselshell Rivers. Movement of the cattle into the area came with the control of the Indians and the buffalo and the coming of the Northern Pacific Railroad. Agriculture had developed with mining in western Montana. Cattle and sheep ranchers occupied most valleys of western Montana and settlement was pushing eastward as rapidly as Indian resistance was pushed back. In 1881, Granville Stuart moved 5,000 head of cattle into the area south of the Missouri from Oregon and Washington. In the next year, 12,000 more were trailed from Oregon and Washington. In 1884 more cattle were brought in from Texas. By 1885 the range lands south of the Missouri were covered with cattle and much of the land was already overgrazed. This was the era of the open range. Cattle were run in large roundup associations. Small ranchers who had moved into the area from western Montana were virtually crowded out. The widely publicized opportunities for profits encouraged big investment in cattle. Eastern and foreign capital poured into the growing cattle herds. In 1886 Stuart and Kohrs had 21,500 cattle roaming the range. Four roundup associations in the area ran 124,000 cattle.

The range associations were organized to control the range as well as the livestock. They kept out the small operator. Later they tried to stem the advance of the wheat farmers and acted as their own law enforcement and judicial branch. The Missouri Breaks area was largely a rugged and inaccessible area and formed a natural barrier to movement. It became the early hideout of outlaws and cattle rustlers. The stock associations under Stuart and Fergus, acting as a vigilante group, put an end to the activities by these outlaws by hanging and shooting a number of them without trial.

The severe winter of 1886-7 marked the end of the period of the open range. Beginning in November and continuing into spring, blizzards followed each other across the plains. When the grass greened in the spring, Stuart's company had 240 live cattle left of 21,500. Average loss was estimated at around 85 percent. Most of the large companies, financed with outside capital, went bankrupt. By 1890, the Judith Cattle Association moved its herds north of the Missouri, and estimated 70,000 head.

The cattle industry from this time on has been based on privately owned land along with controlled public range. In 1888, the Indian reservation north of the Missouri was greatly reduced in size and the remaining area opened for settlement. This area continued as open range for some time but overgrazing of the range coupled with periodic winter losses, summer drouth, and low prices for beef, finally brought the era of the open range to a close.

(2) Sheep - The first sheep brought into the Judith country were a band of 400 brought in from Idaho in 1877. The number increased rapidly and by 1887, Fergus County had almost 190,000 head, second highest in the state to Meagher County. By 1897, Fergus County had over one-half million sheep. Most of these came from Washington, Oregon, and California. The rise in numbers came during a period of declining prices for wool and almost no market for mutton, as opposed to the rise in cattle which coincided with a rise in the price of beef. The low cost of production was the prime factor in the rise of the sheep industry. Sheep were cheap and it was possible to purchase them on shares. A man might rent a band of sheep for one-half the wool and at the end of three years get one-half the increase plus what was left of the original band, or pay an annual rent of one dollar per head and return the original number in three years. This was possible with sheep because of the close attention and management required. Wool was freighted to Fort Benton, Judith Landing, Great Falls, or Billings, where it was consigned or sold to representatives of eastern firms. Sheepmen depended on a combination of private and public land. They took out homesteads and obtained more land

homesteaded by members of the family or employees. More land was acquired by purchase. Sheep had to be fed in winter and housed during lambing and severe winter weather. Losses during the severe winter of 1886-7 were far less than in cattle and loss did not lead to bankruptcy. In 1885, the estimated number of cattle and sheep in Fergus County was about 100,000 each. By 1888 the number of sheep had doubled while the number of cattle had dropped to less than 40,000.

Relations between cattlemen and sheepmen were generally amicable. Serious conflict over the open range was perhaps avoided by the decline of the cattle industry. The two were more likely to agree and combine their pressures against the advances of the wheat farmers and homesteaders and against the wolves that ravaged their flocks. Some ranchers ran both cattle and sheep.

Dry Land Grain

Grain farming started in northern Montana as a supplement to stock growing. The end of the era of the open range placed a premium on the growing of supplemental feed. Oats was the important grain crop. Some barley was also grown for feed.

Production of wheat moved westward across the Great Plains in halting steps. Small grain farming had started in the eastern Dakota plains by 1870. Freight rates were high, the distance to market was great, and the wheat raised was too hard for milling with the technology of the day. The depression of 1873-78 bankrupt the Northern Pacific Railroad and brought wheat prices down. This coincided with the 1874-5 drouth and grasshopper plague in Dakota.

During the late 1870's improved weather conditions and business recovery again made capital available. Farm machinery had been developed for large scale farming and milling technology had created a demand for hard wheat as a premium product. This led to the great Dakota boom of 1879-89. Bonanza farming based on steam power enabled one man to farm large acres of dryland. The program was launched by the railroads which gave rebates on large wheat shipments as well as discounts on machinery and supplies. The period of 1890-97 was a period of national financial depression and loans were called in. This period coincided with recurring drouths and grasshopper plagues. Relief on land payments to the government was provided for to reduce loss of property.

In the late 1890's, weather and financial conditions improved again. By 1902, the railroad companies led a program of promotion and speculation in land for dry land grain. The Milwaukee railroad which had expanded into central Montana, began to advertise in 1906. In 1908, it produced pamphlets on the Judith Basin and provided excursions for prospective settlers to Lewistown at reduced rates. Judith Basin was said to be the best advertised spot in the United States at this time. The Great Northern followed in 1909 putting great emphasis on the productivity of the lands and considerably de-emphasizing the shortage of rainfall. Promotion hit new highs in 1911. Bankers, merchants, as well as farm implement companies promoted settlement. This was the great period of immigration into the area. Population in the five counties reached the peak at this time. At first only spring wheat was grown. Drouth and crop failures gradually led to the use of more winter wheat.

The Effects of Climatic and Financial Cycles

Drouth, hail, and grasshoppers returned to plague the area in the period of 1917-21. Failures of grain crops were paired with high feed prices and shortage of range for livestock. Many herds were sold at reduced prices. In 1919 government guarantees were dropped and prices slid. A further drop in prices in 1924 led to general liquidation. The Federal Reserve Bank, in order to arrest the credit expansion of the war years, raised the re-discount rate and urged the reduction of loans. One hundred fifty banks failed in Montana. By 1924, there were as many as 500 to 999 foreclosures per 1,000 farms. There was again need for federal relief programs. The early period of grain farming in this area emerged with the support of weather and demand and terminated during a period of both drouth and falling prices.

During the period of 1920-28, there was considerable consolidation of ownership. Ranches became larger as the number of ranchers dropped. Mechanization in the larger acreages increased. With improved weather conditions, 1928 became a peak year for wheat production.

The Great Depression brought this area to its knees. The 1929-32 drouth brought meager yields at reduced prices and the dry land areas became centers of major collapse. There was widespread loss of property. Erosion was severe, the grasshopper plagues returned. Livestock farmers were as badly off. Lack of feed forced ranchers to sell on a declining market. The Federal government came to the aid of the people with a variety of programs. Emergency cattle buying plus relief and credit programs provided relief. The re-settlement program purchased farm lands and returned them to grass.

Since the 1940's improved farming methods, weather conditions, and a high, stable, supported price for grain, have led to a considerable stability in the agriculture of this area. Improved grain varieties, tillage technology, as well as greater knowledge of conservation farming methods have served to provide some insurance against drouth. The severe drouth of 1961 combined with a threatened grasshopper plague brought prompt government aid. Prices held, emergency feed was provided and grass hoppers were controlled.

Water Resources

Except for the early period of navigation, little use has been made of the Missouri River. The river in this area has not lent itself to irrigation development since the river bottom is generally steep with few natural benchlands. Natural diversions are impractical and because of the small areas which could be irrigated, would not be economical. Irrigation in the five counties is centered around the Milk River and along smaller streams such as the Judith River and smaller streams on the upper benchlands high above the Missouri.

There have been no power dams built in the area. Power is generated at Fort Peck Dam downstream and at several private dams above Fort Benton and at Canyon Ferry Dam east of Helena. Canyon Ferry and Fort Peck Dams also provide the principal flood control storage for the upper Missouri. Flood damage has not been great because of the small amount of flood plain in the reach of the river under consideration.

Transportation and Communication

The Missouri River was the early lifeline for settlement in western Montana. It was the main artery for exploration for the fur trade and the early gold mining activities. But its importance began to wane when the first railroads entered the state: the narrow gauge Utah and Northern into Butte in 1881; the Northern Pacific in 1883. Travel on the Missouri came to an end in 1888 when the Great Northern established its station one mile out of Fort Benton, not being permitted into the jealous city. The railroads found the Missouri Valley too rough for a railroad route. The Northern Pacific found the Yellowstone Valley a cheaper route. The Great Northern chose the flatlands north, the Milwaukee used the Musselshell. The Missouri Breaks became a forgotten land. Rich in early history they became a no-man's land as settlement passed them by. The land was too rough and the soil too infertile for agriculture. Except for a few irrigated benches around the river, the area is grazing land, low producing and overgrazed. Spur lines were built into the area from the Milwaukee and Great Northern lines with the wheat boom. Plans for an early road system were abandoned when the railroads were built. Roads became feeder systems to the railroads until expanding population, high railroad freight rates and the invention of the automobile led to highway expansion. The Montana State Highway Commission was established in 1913 and the Federal Aid Road Act was passed in 1916. By 1930, there were 1,846 miles of highway in Montana, mostly gravel surfaced. A network of surfaced highways now serves the area. A greatly expanded Federal aid program over the past few years and projected for the future will provide a modern highway system for the area. The local people are interested in a new highway north and south which will provide an all-weather road with a bridge over the Missouri somewhere between the Robinson Bridge and Fort Benton.

THE PRESENT ECONOMIC BASE

Locally and regionally this area is one of slow growth, slower than the national average. The economy is based on the production of grain and livestock. While the total dollar value of agricultural products has been rising, the number of farms as well as the number of total population for most of the area has shown a steady decline since 1920.

Population

From the time of first settlement to the period of the first World War, the population in the five-county area grew very fast. Since then it has declined regularly but unevenly by decades:

Date	Total Population
1920	57,763
1930	44,393
1940	39,897
1950	36,865
1960	36,338

In addition to the general out-migration of people since 1920, there has also been a marked shift within the area. In 1960, 15,127 people lived in the towns of Lewistown (7,408), Chinook (2,326), Harlem (1,267), Fort Benton (1,887), and Malta (2,239). All these towns, as well as some smaller towns, showed growth over the past several decades, indicating a shift to urban settlement and an even greater decline in rural population than the total population figures show. The decline in rural population can be laid to two causes: One, the reduced number of farms and the increased displacement of labor by machinery and, two, the tendency for farm families to move to town so that the family can enjoy the amenities of urban life, particularly the educational opportunities for children. There has also been a considerable change in the population by age classes. Out-migration has been greatest for people in the early working years, leaving a higher percent than normal of older and younger people.

Agriculture

While the number of farms decreased, farm size has increased and the value of the farm has increased considerably. The total amount of land in farms also has increased.

Year	No. of Farms	Total Land In Farms	Avg. Size of Farm	Total Value of Land and Buildings	Average Value of Land & bldgs/farm
1960	3,433	9,074,488	2,643	$312,681,031	$91,081
1950	4,117	8,353,737	2,029	138,141,978	33,557
1940	5,173	6,961,895	1,346	45,875,536	9,257
1930	6,787	6,643,345	979	74,847,356	11,028
1920	10,474	6,326,660	604	145,647,732	13,906

The reduction in farm numbers has taken place while the total land in farms has increased by more than two and one-half million acres. (Part of this is due to changes in methods of census enumeration.) Greater investment in machinery, increased cost of operation require larger farms, both in grain and livestock. The size of the marginal operation is increasing. The cost-price squeeze has tended to eliminate farms, either by sale or rental. Better job opportunities in towns in the area and out of it draw farm youth and agricultural labor away from the area. Improved education and training have to some extent qualified these people for better jobs. But movement off the farms is lagging. There remain many units too small to provide an adequate income or to fully employ the operators. There exists, therefore, a considerable amount of under-employment of both labor and capital in this area.

Total and average values for land and buildings reflect the cyclic nature of the local agricultural economy. The reduced values of 1930 and 1940 show the effects of the serious drouths and price declines in the 1920's and 1930's. The phenomenal rise since 1950 reflects the general boom in real estate values. The implications of these figures are significant in terms of taxes and public income as well as for the investment required to enter the farming business. The cost of machinery and livestock required is also increasing so that the total investment in a farm unit is expanding considerably faster than the value of land and buildings alone.

The scale of this investment places a premium on quality of agricultural production and management: Greater intensity of cropping on the best lands, the use of more efficient equipment, and increased use of fertilizer. Government price supports and acreage controls have encouraged concentration of capital on the better soils and the retirement of poorer soils to grass. The same is true with livestock where the successful producer works toward a higher quality of animal produced on better feed: Improved hay, supplemented with concentrates, and the use of high quality pasture. Low quality beef run extensively on low yielding overgrazed range is recognized as uneconomical agriculture and poor management.

In 1959 there were about one-half million acres of wheat produced. This acreage has been fairly constant, declining by about 100,000 acres since 1940. The maximum acreage in wheat was in 1930 when nearly 800,000 acres were harvested. This was approximately double the 1920 acreage which, in turn, was double the 1910 acreage.

The number of cattle has shown a steady increase since 1920. There were 166,130 head of cattle in 1920, and 332,421 in 1959. The number of sheep has declined since 1920 although the fluctuation has been irregular. In 1920, there were 269,867 sheep and 189,744 in 1959. In 1930, there were 432,765 sheep.

The value of all crops has fluctuated over the years. The value of field crops produced has fluctuated more than the value of livestock:

	1959	1950	1940	1930
Value of all produce	$55,131,373	$41,867,558	$17,280,546	$29,970,142
Value of livestock products	25,306,148	18,632,317	9,408,676	16,248,053
Value of all field crops	29,825,225	22,235,241	7,871,870	13,702,089

The field crops are grown on less than one million acres and the livestock on about eight million acres. Grain and other field crops are intensively cultivated on the best soils while livestock is produced on the poorer soils which are devoted to range as well as some of the better soils which are in hay or pasture. The trend in agricultural land use is toward reduction in grainland along with more intensive management and the improvement of grasslands.

Most agricultural products produced in the area are marketed outside the area and the income from these products represents the principal basis for the economy of the area. Historically, the market for Montana agricultural products has been to the east. Grain is still shipped to the Twin Cities as well as other milling centers. But livestock products are steadily finding a better market to the west. Since 1955, more beef from this area is shipped west than east. Even some lambs are shipped west.

Manufacturing

The 1960 census lists 28 manufacturing establishments within the five-county area. Only three of them, the Lewistown newspaper, a stone and clay plant, and the Blaine County gas fields, employ more than twenty people. The majority of the establishments manufacture materials used within the area. There are 11 plants engaged in the preparation of food, five produce wood products, six are in printing or publishing, three are producing stone, clay, or glass products, and one plant each is engaged in metal fabrication, machinery construction, and coal mining.

Local manufacturing supplies only a small part of local needs and most materials used in the area are imported from the outside. All large, mass-produced items are brought in from far away manufacturing centers. This includes farm machinery, automobiles, gasoline, most fuel, and most building materials. Most food items, published material including newspapers, clothing, furniture, fixtures, chemicals, and even livestock feed concentrates are imported. Local manufacture provides only part of the local needs of the items it manufactures.

The number of manufacturing establishments and the number of people employed in manufacturing within this area has fluctuated with population. It has also shown a shift away from the small communities. Lewistown has increased its activities in food processing as smaller communities lost them. The period of highest activity in manufacture was during the days of the gold boom. In the early period of the wheat boom there was a greater demand for local manufacture and repair of equipment, both steam and horse driven. Blacksmithing was a mainstay of early manufacturing. The shift to precision built machinery and repair parts has shifted the center of manufacturing away from the small local plant.

There is little likelihood of an increase in manufacturing in this area. Grain milling for flour has long been concentrated and decentralization is unlikely. There may be some possibilities in preparation of livestock feeds or fertilizers for local consumption although Billings and Great Falls would be more likely to meet the needs here by expanding their activities. Meat packing is a similar possibility but, again, Billings has concentration yards now and would be a more likely center for expansion in this direction. Another possibility might be in a revival of mining if the availability of cheap power or demand changes might make present mines economical.

Mining

About 120 people were employed in mining in the area in 1960, as compared to 369 in 1940. The decline reflects both a lower income from mining and the improvement in other employment opportunities in the area and outside.

Oil booms were responsible for considerable activity in Petroleum County as well as in Phillips County during the thirties and forties. In 1957, Bowes field in Blaine County produced 305,987 barrels of oil and 801 million cubic feet of gas. The Cat Creek field in Petroleum and Garfield Counties produced 164,754 barrels of oil. The Rattlesnake Buttes field in Petroleum County produced 543 barrels of oil. The Bowdoin field in Phillips County produced 3,579 million cubic feet of gas, 12.1 percent of the gas produced in the State.

Service Industries, Retail and Wholesale Trade

The 1960 census lists 204 establishments in the area under its listing of selected services. Only eighty of these establishments have payrolls. Total receipts for all establishments, with the exception of one in Petroleum County, were $3,254,000. The payroll for the year was $556,000 to a total of 278 employees. Personal services, laundries, beauty and barber shops account for 73 establishments and receipts of $1,003,000. Auto repair services and garages account for 26 establishments and $533,000 in receipts. All other services, which include hotels, motels, tourist courts, miscellaneous repair and business service, motion pictures, amusement, recreation services and others, account for the remaining 105 establishments and more than one and one-half million dollars in receipts.

There are 503 retail establishments in the area. Data for the 13 in Petroleum County are withheld. The remaining 490 establishments account for a total annual sales of $43,657,000. There are 491 active proprietors and 1,949 employees and an annual payroll of $12,666,000. There are 66 food stores with gross sales of $8,626,000; 70 general stores with sales of $4,712,000; 35 auto sales with $8,471,000; 65 filling stations with $3,217,000; 75 lumber and hardware stores selling $9,063,000 annually; and 35 general merchandise stores; 22 apparel stores, 9 furniture stores, 93 eating places, and 12 drug stores.

The total number of retail stores as well as the number of establishments in most categories has declined over the past twenty years. However, the total sales, number of employees and the total payroll have all shown significant increases. This reflects the national trend toward larger establishments in most categories of retail trade. In fact, this area may be considered to be lagging behind the general trend. This trend can be expected to continue.

There were 146 wholesale establishments with total sales of $40,759,000 in 1958. They employed 285 people on a payroll of $1,095,000. The trend in wholesale business is toward greater concentration in the larger centers such as Billings and Great Falls. These two cities now carry on much of the wholesale business for this area; they can be expected to carry an increasing proportion of the business in the future.

Transportation and Communication

Railroads are declining in importance as traffic is reduced and branch lines are abandoned. None of the branch lines still in use carry passengers. Considerable amounts of livestock and grain are still transported by rail. Trucks are carrying increasing amounts of all freight, including agricultural products, and are the principal short haulers, particularly from Billings and Great Falls.

Improved highway systems have facilitated transportation throughout the area although some outlying communities and many ranches are not provided with surfaced roads. There were 13,298 passenger cars and 9,285 trucks licensed in the five counties in 1957. Buses take care of the passenger service. None of the highways in this area are included in the proposed Inter-state system.

The Missouri Breaks area is the hinterland for these counties and is provided with only unsurfaced roads. There are but four access roads to the small ferries and some unimproved rancher roads to isolated river points. Local residents hope for a surfaced through-road north and south with a bridge to provide transportation and communication between Lewistown and northern Montana points.

Pipelines constructed to Cat Creek, Bowes and Bowdoin fields transport oil to refineries and gas to market.

Only part of the area is now connected to telephone. Figures from 1956 show the following:

County	Percent with Telephones
Blaine	21.4
Chouteau	2.1
Fergus	37.0
Petroleum	1.6
Phillips	30.8

The Lewistown Daily News, with a circulation of 4395, is the only daily newspaper in the area. Daily papers from Billings and Great Falls are regularly circulated in the area. There are several local weekly newspapers:

Weekly Newspaper	Circulation
Big Sandy Mountaineer	838
Chinook Opinion	1548
Fort Benton River Press	1659
Geraldine Review	450
Harlem News	975
Lewistown Argus-Farmer	1863
Phillips County News (Malta)	1985
Saco Independent	367
Winnett Times	593

There is a radio station at Lewistown. Billings, Great Falls and Helena stations are regularly heard in the area as well as stations further away. Television stations in Billings and Great Falls are regularly viewed in this area. The number of receiver sets is relatively small.

Western Airlines provides daily service to Lewistown on its north-south flights through Great Falls and Billings.

Power and Fuel

All the power and most of the fuel consumed here is imported. Most of the consumers in the area are served by private distribution lines except for the 2716 served by the Fergus Electric Cooperative out of Malta. These two cooperatives were financed by the Rural Electrification Administration and purchase their power from the Montana Power Company. The proportion of dwellings using electricity in 1956 is well below the national average:

County	Percent of Dwellings with Electricity
Blaine	83.4
Chouteau	89.9
Fergus	90.1
Petroleum	68.3
Phillips	75.9

Natural gas provides fuel in a few communities convenient to developed fields. Oil is the fuel most commonly used in other communities and most rural homes. Its convenience makes it a desirable substitute for locally produced coal or wood.

Recreation

At present there is no developed recreation in the Missouri Breaks area above Robinson Bridge and there is little promise of increased use. Its reputation as a remote area attracts a few visitors each year. The growing interest in float trips is bringing the area some publicity.

There are outdoor recreation developments around the towns, particularly Lewistown, and in some of the mountain areas. Public resorts, organization camps, and summer homes are being built around Fort Peck Reservoir. These developments attract local residents and some visitors from surrounding areas and encourage an occasional through traveler to stop over.

The principal cross-country routes, U. S. Highway 2, the "highline," as well as Highways 10 and 12 to the south, carry a heavy traffic of tourist travel. Fuel, food, and lodging provide a brisk business along the main routes, but only a few of these tourists are induced to depart from the through routes to partake of recreation attractions in this area. They are a potential source of visitors if local scenic areas could be developed to interest them. Tourist travel is a potential source of income to this area.

Development of the scenic areas here would contribute to the national need for outdoor recreation opportunities; it would also increase the opportunity for participation in outdoor recreation by people from the local area and the adjacent region. It would improve the quality of living as well as provide increased income and employment opportunities.

Fish and Wildlife

Sport hunting in this area is enjoying a growing reputation. The Missouri Breaks and the adjacent Fort Peck Game Range support some of the most important game herds in the region. The reputation of the area for trophy deer and elk heads as well as the convenience of hunting and the quality of the meat is attracting growing numbers from all parts of Montana as well as other States.

Due to silt and other suspended materials and water temperature, the Missouri River is not suitable for trout. Local people fish for warm water species such as channel, catfish and sauger. However, much of the Missouri River in this area is dominated by rough fish such as carp, suckers, and golden eye.

The values to be derived from increasing the numbers of present game species and also possible introduction of new game species, such as buffalo, would have to be measured against the possible reduction in grazing for domestic livestock and crops. These values should be both in terms of local incomes as well as intangible benefits and costs and also in terms of relative national need for the products and services which are or could be produced.

Employment and Income

The total labor force was listed at 13,313 in 1959. Of this number, 9,940 are men, 3,373 women.

In 1958, agriculture provided employment for 4,084 people. This was approximately one-third the number employed in 1930. The downward trend has slowed down during the past decade but can be expected to continue as farm consolidation continues, as more labor is replaced by machinery, and as employment opportunities in other activities remain at a high level.

Employment in retail trade, wholesale trade, and service industries can be expected to increase relatively and absolutely although continued out-migration will tend to slow the rate of growth.

Employment in construction had increased considerably in 1958 over any year since 1930. There were 739 construction workers in 1958.

Listed as unemployed in 1959 were 509 people. The relatively low proportion of unemployed indicates that out-migration is keeping pace with the decline in job opportunities. These figures do not reflect the underemployment which exists in agriculture as well as small businesses.

ECONOMIC TRENDS

Projection of Economic Activity

From a national standpoint, the area is primarily important for the grain and livestock products it exports. While wheat is a surplus crop, the wheat grown in this area is a high protein product and is, therefore, important for the national diet. Livestock products from this area will become more important as western populations grow and the demand for meat increases. This area will continue to suffer from the vagaries of weather as it did in 1961. The local farmers and ranchers will continue to need assistance periodically to stay in business. It will require progressively less labor to operate these farms as machinery replaces labor and as farms increase in size by consolidation. Research and technology are increasing the productiveness of farm labor at a rapid rate.

The gas and oil produced are important mainly from a regional standpoint. The gas is used in Montana. The oil is piped to Montana refineries. The level of activity can be expected to decline as present fields are depleted. Expansion will depend on new discoveries.

Hunting is important to a widening regional area as well as to local people. Hunter activity can be expected to increase as greater abundance and variety of game species are provided. The increased income derived will need to be measured against the possible reduction in livestock income if any considerable amount of rangeland is diverted to game use.

The minute-man missile bases being established here are, of course, a highly important link in our national defense system. After the construction period, the maintenance of these bases will provide a continuing level of income.

From a national standpoint, this is also an important market area for many products manufactured throughout the nation. A healthy local economy is important here as everywhere to continue providing markets for a vast array of manufactured products.

The isolation of the area, particularly the rural areas, makes it difficult and often very costly to provide services such as electricity, telephones, running water, and other amenities which are now accepted as necessary to our standard of living. Although family income is fairly high, the quality of living, measured in these terms, is below the national level.

Needs

The great need in this area is the development of new sources of income.

Agriculture, the principal economic base, is declining. Although income from agriculture continues to grow, costs are also increasing. Capital continues to replace labor and capital availability is necessary for the agriculture of this area to keep pace with national trends. The net effect will be continued from consolidation and out-migration of excess labor so long as alternative employment in the area is limited.

Increased public works are necessary to provide local needs but the need decreases as population shrinks. The burden for providing public works increases on the remaining population as the numbers shrink. Defense-based public works have injected some vigor into the economy but the level cannot be expected to absorb the growing need for employment.

Discovery of new minerals and fossil fields is a possibility for expansion. Exploration needs to be accelerated.

Expansion of manufacturing based on present resource use is unlikely. Agricultural products are processed outside the area. Livestock feeding may be a possibility in this area.

Development of electric power offers many possibilities for this area. Power using industries might be attracted; it would improve the level of living in the area by expanding services to outlying areas and increasing per capita consumption.

Improvement of recreation and hunting would improve the quality of life of the local people and by attracting people into the area would increase local income.

The quality of life in this area can be improved in a variety of tangible and intangible ways. The whole population benefits from improved income in the community and from the many amenities which accrue from a growing economy nationally as well as locally. The area needs considerable development of utilities, transportation systems, educational facilities, and so on. Some of the problems are the product of isolation, the sparsity of population. The main effect of isolation is to make the cost of all services more costly because of distance. The problem of distance cannot be changed until the population grows considerably. This is not a foreseeable possibility. But the cost of providing services to isolated homes can be reduced by reducing the cost of the service. Cheap power would have this effect. Another means would be to reduce the proportion of taxes paid on land by developing other sources of public revenue which would make it possible for local governments particularly to provide a higher level of services.

Potential without River Development

The local economy can be expected to decline with the agricultural sector if there is no development of the river. While expanded defense activity may serve to bolster the economy for some time, the eventual outlook gives little promise for any other significant export industry. There may be some possibility of agricultural-based industry, such as meat processing. The increased growing of feed grains, particularly barley, in this area may induce more livestock feeding as well. The extent of this activity would be relatively minor although it would aid both the rural and urban economies of the area. Further diversity of crops or livestock is not likely.

Hunting and recreation could be expected to bring an increasing number of people into the area although the total contribution to the area might be relatively minor. Without some extensive recreation development of the Missouri Breaks area, the number of visitors to the area will remain small.

The standard of living and the service provided by local government will rise very little without a stronger tax base to support it. Cost of supplying power and other utilities is more likely to rise with rising costs unless cheaper power sources are developed.

The general outlook for the area without river development would, therefore, be for a declining local economy, continued out-migration, and a personal income and standard of living growing at a level below the national average. Reduced population would lead to higher government costs and rising taxes on those remaining, or a reduced level of services or, probably, both.

PART II - THE MISSOURI BREAKS STUDY AREA

DELINEATION OF STUDY AREA BOUNDARY

GEOLOGY

CLIMATE

SOILS

Steep Broken Lands
Thin Clay Soils over Shales
Thin Loamy Soils over Bedrock
Moderately Dark Colored Loamy Soils

LAND STATUS AND OWNERS

NATURAL RESOURCES, THEIR USE AND ADMINISTRATION

Forage
Forage Use (Livestock and Wildlife)
    Cattle
    Sheep
    Wildlife
Big Game vs. Livestock
Watershed
Crop Production
Minerals
Timber
Summary Comparison of Area's Resource Use Returns to Economy

RECREATION

Existing Recreational Developments
Present Recreational Use
Recreation Potential

STUDY AREA PROBLEMS

Access
Land Tenure
Fire Protection
Erosion
Range Depletion and Deterioration
Wildlife

PART II - THE MISSOURI BREAKS STUDY AREA

The area selected for study is generally rectangular in shape and contains approximately 1.8 million acres. It is practically impossible to collect significant statistical data regarding the public land alone within an area such as this. Consequently, data is shown for the entire study unit, recognizing that the public land is only a partial contributor to the statistics developed. This may be the most significant and meaningful way in which this area can be analyzed since the private and public lands are mutually dependent and are used together.

This area extends along the Missouri River approximately 100 miles from Arrow Creek on the western edge east to the Musselshell River and extends both northward and southward from the Missouri a distance of 5 to 25 miles. It includes southern portions of Blaine and Phillips Counties, northern portions of Fergus and Petroleum Counties, and the eastern portion of Chouteau County. The breaks themselves extend for another 80 miles eastward on both sides of Fort Peck Reservoir.

The surface features immediately adjoining the Missouri River in the area under study are a rough, broken terrain with narrow, steep-walled gullies and gorges. This "breaks" effect extends a considerable distance upstream in some of the larger tributaries such as Armell's Creek, Cow Creek, and Bullwhacker Coulee. From the furthermost reaches of these drainages, the terrain flattens out to a typical plains area with a gently-rolling landscape extending to the boundary of the study area. The topographic relief in the breaks is about 500 feet near the Musselshell River and 800 feet near the Judith River. The Missouri River bottomland is relatively narrow with practically no valley at the western end of the study area to a width of approximately 2 miles on the eastern end.

DELINEATION OF STUDY AREA BOUNDARY

Several factors affected the selection of the study area boundary. An attempt was made to restrict the study area to a concentration of public land. In this respect, the public domain lands and land utilization project lands make up 54 percent of the total surface area. Natural physiographical features were used, such as the Musselshell River on the eastern edge of the study area. Bureau of Land Management administrative unit boundaries were used in both the Lewistown and Malta Districts to simplify data collection. The Fort Belknap Indian Reservation and Lewis and Clark National Forest made a logical boundary on the north.

GEOLOGY

During pre-glacial time, the Missouri River flowed northeastward from Great Falls to Havre and then eastward along the four to six-mile wide valley now occupied by the Milk River. As the glaciers moved southward out of Canada, they forced the Missouri River to seek a new channel south of its original course. The present Missouri River channel south of the Bear Paw and Little Rocky Mountains and eastward to its junction with the Milk River is relatively young and has had a proportionately short erosion period. This accounts for the narrow and steep-walled character of the channel and of its tributaries.

The outstanding characteristic of the breaks is the unique, picturesque, and sometimes colorful outcrops. Some of the harder rocks, offering more resistance to erosion, form "cap rock" over the softer materials. This condition permits the development of numerous near-vertical cliffs which, not infrequently, may be 100 feet or more in height. Hundreds of feet of the bedrock stratigraphy is thus exposed in the cliffs and steeper slopes. While most of the rock horizons are somber shades of brown and grey, an occasional dark, carbonaceous shale or coal bed creates a sharp contrast with the rocks above and below it. In some areas, thin, light-grey, bentonitic shale beds provide a very noticeable color contrast. Observed from a high vantage point, such a bed frequently can be traced for long distances in the main valley and larger tributaries. Once the "cap rock" has been removed, erosion of the softer rocks may form long knife-edged ridges. These conditions are more prominent and striking in the western portion of the area than in the eastern. In the latter, the slopes are not quite so steep, the hills and ridges tend to be rounded and less bedrock is exposed. This might be explained by the predominance of softer formations containing relatively few harder rock horizons to act as protective "cap rocks".

In the eastern part of the "breaks" the Missouri River is entrenched only in the Bearpaw formation. This formation is typically a dark grey, clayey shale that weathers into a distinctive gumbo soil. Some horizons of the Bearpaw formation may contain hard, haphazardly-located calcareous and ferruginous concretions (a round or disc-shaped aggregate formed by the segregation and precipitation of some soluble mineral-like quartz or calcite around a nucleus which is often a fossil) which may be observed in place in the better outcrops on the steeper slopes. Bentonitic and gypiferous clay horizons frequently impart a light grey or white color to their weathered outcrops. In other instances the shales in the formation may weather to a tan or brown clay.

In the western part of the breaks area the Bearpaw formation is faulted heavily by a series of closely-spaced faults which bring the underlying Judith River and Claggett formations to the surface. On the geologic map, these formations appear as long, narrow strips closely paralleling the faults and surrounded by the Bearpaw formation. The formation is entirely absent in the last five to ten miles of the western part of the breaks area. Here it gives way to the older and underlying Judith River, Claggett and occasionally to the still older Eagle and Colorado shale formations.

These formations, particularly the Judith River and Eagle, contain several prominent sandstone beds and persistent concretion horizons which are harder, or become harder on weathering, than the interbedded clay and shale. These horizons comprise the "cap rocks" referred to above. The Judith River formation consists of greyish-white sandstone, grey and brown sandy shale and grey-to-brown and tan clay. It is prominently displayed in the badlands topography in the western portion of the breaks area where it plays an important role in forming the unusual surface features. The Eagle formation is very distinctive and easily recognizable because of the lower massive yellow sandstone member known as the Virgelle sandstone. This horizon weathers into prominent sandstone ridges and vertical cliffs and forms the "rock walls" noted by Lewis and Clark in their expedition along the Missouri River in the year 1806.

All of the formations discussed above and found in the breaks area are Upper Cretaceous in age and were deposited some 60 to 100 million years ago. It is interesting to note that the Bearpaw formation is of marine origin; that is, the sediments were deposited in a shallow, Cretaceous sea which invaded Central and Eastern Montana during Bearpaw time. The upper part of the underlying Judith River formation is a brackish water deposition, while the lower part is a continental or fresh-water deposit which contains the fossil remains of numerous dinosaurs. The Claggett shale is marine in origin, the Eagle is continental, and the very thick Colorado shale is marine. The Colorado shale is the oldest formation exposed in the area under discussion. The alternating marine and fresh-water formations indicate that the Cretaceous seas invaded and retreated a number of times during the period when these formations were being deposited.

The continental glaciers covered very little of the breaks between the Musselshell and Judith Rivers. The Bearpaw and Little Rocky Mountains acted as a barrier so that the ice flows passed around the Bearpaws on the west and the Little Rockies on the east. A small amount of glacial debris occurs on both sides of the Missouri River at the extreme east and west ends of the breaks area.

CLIMATE

The climate in the breaks area is typical of the plains region of Central Montana. It is characterized by severe, windy winters broken with occasional warm chinook winds, hot summers, and relatively sparse precipitation. Temperature variations between winter and summer have varied from -59° to 113°.

The normal precipitation and duration of frost-free days are shown on the following table for the five counties within which the study is located:

County	Normal Precipitation (inches)*	Average Number of Frost-Free Days Between Spring and Fall
Phillips	12.44	131
Blaine	13.04	119
Chouteau	14.74	127
Fergus	16.90	107
Petroleum	12.65	122
TOTAL	69.77	606
Average	13.95	121

*These figures are the average of all weather reporting stations in each county for the past 25 years or less. (Montana Agricultural Statistics)

This rather unique climate is usually sufficient to produce good yields of range forage. However, crop production is marginal, depending on the individual year's precipitation. Most dry-land farming within the area must rely on strip farming and summer fallowing practices because of the prevalent winds and the limited moisture available.

SOILS

The area under study is subdivided into four general soil type areas according to composition of the soils and topography. The four general areas are listed below and each is briefly discussed.

Soil Type Areas	Estimated Percentage
Steep broken lands	55 percent
Thin clay soils over shales	35 percent
Thin loamy soils over bedrock	4 to 5 percent
Moderately dark colored loamy soils	5 to 6 percent

Steep Broken Lands

This is the area commonly known as the "Missouri River Breaks" consisting of steep, broken, and extremely rugged badlands occurring along the Missouri River. It ranges from 1 to 10 miles in width on either side of the river and extends farther up into the watersheds of some of the tributaries such as Arrow Creek. There are significant inclusions of loamy bottomlands one-half to one mile wide through which the river meanders from one side to the other.

The bottomlands, though significant, comprise probably less than 5 percent of the total area. These bottomlands are subject to flooding possibly once in 6 to 10 years when ice jams occur. Some of the bottomlands are vegetated with native deciduous trees. Others, though not easily accessible due to the breaks on either side of the river, are irrigated and used for hayland.

Landscapes within this badlands and broken slopes area consist of rounded, grassed-over hills intermingled with deep and steep-sided canyons, sharp ridges and buttes all carved from stratified sedimentary formations of variable grey and brown colors. These rugged hills and badlands, in many places having a relief of 600 feet or more, provide some spectacular and awesome views. The rather shallow clayey soils intermingled with shale exposures that occur in these breaks are best adapted to native forage production. They produce a limited amount of grasses for grazing of livestock and wild game. Significant patches of ponderosa pine, Douglas fir, and juniper occur on some of the north slopes.

Thin Clay Soils over Shales

This area lies both on the north and on the south of and adjacent to the "Missouri River Breaks." The land within this area consists largely of very slowly permeable clay soils 10 to 20 inches deep over clay shales. Some of these soils contain appreciable amounts of saline and alkali salts. The topography is gently to sharply rolling and is commonly dissected with intermittent streams. Considerable runoff occurs on these very slowly permeable soils during periods of heavy rainfall and rapid snow melts.

Some of the more gently rolling areas are used for hay and grain production, though the yields are relatively low over a period of years. The greater part of the area is used for the grazing of livestock for which it is best suited. Most of the area is classed as good grazing land with lesser areas classed as suitable for crop production. The common range sites within this area are clayey, shallow over clay, dense clay and panspots.

Thin Loamy Soils over Bedrock

This area of land consists of thin loamy soils occurring in conjunction with sandstone and loamy shale exposures. These soils are underlain by bedrock at depths of 10 to 24 inches. They occur on moderately steep, irregularly-shaped uplands and on very steep slopes. The very steep slopes are broken by prominent sandstone ledges outcropping at various intervals.

Small areas of deep loamy, tillable soils occur on fans and terraces within this area, but for the most part, the soils of this area are best suited for native grass production and constitute fairly good shallow, silty and thin breaks range sites.

Moderately Dark Colored Loamy Soils

These loamy soils occur on residual plains, alluvial plains and in glacial till areas. Where they occur on gently to moderate slopes, they are suited for crop production and are almost all in private ownership. They also occur on steep, irregular slopes. Here they are somewhat shallower in depth and are primarily suited to limited cultivation or to permanent cover.

In relation to the area under study, these soils occur as small fringe areas of the more desirable land to the north and south.

LAND STATUS AND LAND OWNERS

There are four classes of land owners within the area; the Federal Government, State Government, private owners, and Indians.

The land ownership is summarized in the following table:

	(South of River)Acres	(North of River)Acres	Total	Percent
Public Domain Lands	383,350	556,990	940,340	50 percent
Land Util. Proj. Repur. Lands (BLM Admin.)	53,310	3,960	57,270	3 percent
Private	369,270	363,040	732,310	39 percent
State	62,370	52,990	115,360	6 percent
Defense Department	9,440	4,560	14,000	1 percent
Indian Lands	1,280	6,160	7,440	1 percent
TOTAL	879,020 (47 percent)	987,700 (53 percent)	1,866,720	100 percent

The 7,440 acres of Indian lands scattered throughout the area are being held in Trust Title by the Federal Government. Most of these lands are in Blaine and Phillips Counties north of the river.

State lands comprise 115,360 acres of the study area. These lands are scattered throughout the entire area, being primarily Sections 16 and 36 which were granted to the state by the Federal Government as school lands. Most, if not all state lands are leased to private ranchers in the area for grazing purposes.

Private lands comprise the second largest amount of land with 732,310 acres. Most of the private lands are concentrated along the north and south edges of the study area, with small parcels intermingled with national land reserve. The majority of the private lands are situated on the flat plains off of the rougher breaks that extend outward from the Missouri

River. The majority of these lands were transferred into private ownership during the homesteading era of the early 1900's. Homesteading on the south side of the river was carried on more aggressively than on the north side. This probably resulted from the activity of railroad land locators from the Milwaukee Railroad. By 1923, the major portion of the homesteading era had ended.

Federal lands include the national land reserve and Fort Peck Game Range (shown together on tables as "Public Domain Lands"), land utilization project acquired lands, and lands purchased by the Defense Department for dam and reservoir purposes. The Corps of Engineers administers the Defense Department Lands in conjunction with the Fish and Wildlife Service and the Bureau of Land Management. The Bureau of Land Management solely administers all of the national land reserve and land utilization project lands. The Fort Peck Game Range is jointly administered by the Bureau of Land Management and the Fish and Wildlife Service.

The Fort Peck Game Range encompasses some 1,152,000 acres stretching from the Fort Peck Dam 108 miles west along the Missouri River and Fort Peck Reservoir. The game range was established in 1936 by Executive Order No. 7509, which withdrew the lands for the conservation and development of natural wildlife resources and for the protection and improvement of public grazing lands and natural forage resources. This order, in part, provided that the area shall be jointly administered by the Secretary of the Interior and the Secretary of Agriculture, subject to the Taylor Grazing Act. Also, that the natural forage resources therein shall first be utilized for the purpose of sustaining in a healthy condition a maximum of 400,000 sharptail grouse and 1500 antelope, the primary species, and such nonpredatory secondary species as are necessary to maintain a balanced wildlife population.

This order was supplemented by a cooperative agreement between the two administering agencies in 1945 and revised in 1959.

Approximately 244,300 acres or 21 percent of the Fort Peck Game Range is included in the study area. This portion of the game range makes up 13 percent of the total study area.

A breakdown of the ownership pattern of that portion of the game range in the study area follows:

	(South of River)	(North of River)	Total
Public Domain Lands	81,290	127,100	208,390
Land Utilization Project Acquired Lands	1,520	320	1,840
Private	7,790	1,360	9,150
State	4,820	6,440	11,260
Defense Department	9,100	4,560	13,660
TOTAL	104,520	139,780	244,300

The lands under Bureau of Land Management administration are within two administrative district boundaries. All of the lands south of the Missouri River are within the Lewistown District and those lying north of the river are within the Malta District. Of the approximate million acres under Bureau of Land Management jurisdiction, percent are within grazing districts as organized under the Taylor Grazing Act. Each district is further subdivided into smaller administrative units. The study area includes five entire grazing administration units identified as the Bear Paw, Littly Rockies, Chain Buttes, Crooked Creek, and Indian Butte, and a portion of the Judith River Two Calf unit.

NATURAL RESOURCES, THEIR USE AND ADMINISTRATION

Forage

Montana contains 93,361,920 acres of land, of which 58,000,000 are considered to be range or grazing land. The study area contains 1,866,720 acres or approximately 2 percent of the entire area in the state. The entire study area is range or grazing land. It includes all or part of 111 ranch operations.

Common forage species within the study area include western wheat grass, Sandberg bluegrass, junegrass, stoney muhly, needle and thread grass, blue grama, bluebunch wheatgrass, big sagebrush, and sedges.

Range surveys have indicated that the following animal unit months of livestock forage are produced on each of the various types of land ownership. (These figures are based on 1,233,000 acres or 65 percent of the total land area where the total number of AUM's were known, then projected to include the entire study area.) The available wildlife forage has been measured only in the game range.

Type of Ownership	No. of Acres	No. of Livestock AUM's	Percent of Total AUM's
Public Domain Lands	940,340	122,960	40.9
Land Utilization Proj. Acquired Lands	57,270	12,870	4.4
Private	732,310	146,250	48.4
State	115,360	16,480	5.4
Defense Department	14,000	1,390	.4
Indian	7,440	1,390	.5
TOTAL	1,866,720	301,340	100.0

On the basis of these figures, it takes an average of 6.2 acres to produce enough forage to feed one cow for a period of one month.

It should be noted that the various types of big game do not require the amount of forage that is necessary for cattle. As the standard AUM or animal-unit-month is based on the consumption of feed by cattle, a conversion factor has been adopted by the Montana Department of Fish and Game to convert livestock AUM's to big game requirements. The conversion factors are as follows:

5 deer = 1 AUM
1 1/2 elk = 1 AUM
10 antelope = 1 AUM

The Bureau of Land Management and Fish and Wildlife Service conducted a joint range survey on the Fort Peck Game Range to determine the carrying capacity so that proper forage would be available to cover the needs of both livestock and big game. In conducting this inventory, such factors as amounts and types of forage available, terrain, soil types, water, past uses, duration of use, and other management factors were carefully considered. On the basis of this study, grazing capacities and big game allowances were established as follows:

Total AUM's in that portion of the game range within the study area - 38,543

Livestock - 22,015 (57 percent)
Big Game - 16,528 (43 percent)

The Fort Peck Game Range survey attempted to show carrying capacity estimates for wildlife and livestock and assigned a dual use figure for overall carrying capacity. It was recognized that some forage species provide quantities of forage that wildlife can use but livestock would not utilize and also visa versa; hence the dual use figure is more than the livestock or wildlife figures alone. Also, some range types were recognized as primarily livestock or wildlife ranges and assignments of the carrying capacity were made accordingly, but in no case could the assigned forage exceed the amount rated for the type of animals involved.

The Bureau of Land Management is responsible for the management of the forage on the federally owned lands in the study area. This includes all activity relating to the authorization of livestock use. Forage is provided for wildlife use in cooperation with the Montana Fish and Game Department for the study area lands outside the Game Range. Inside the Game Range, the cooperation is prescribed by the Executive Orders and agreements previously mentioned.

The Bureau's forage management activities can be generally categorized as adjudication, use supervision and adjustments, and range improvement and protection.

Adjudication includes the measurement of available carrying capacity, determination of qualifications for the extent of grazing privileges, and establishment of appropriate allotments. This job has not yet been completed throughout the Bureau and many areas are now being used on the basis of temporary adjudicative arrangements. The Bureau hopes to complete this task, nationwide, by the end of fiscal year 1967. In the study area, the area north of the river has been completely adjudicated and 12 percent of the operations south of the river are adjudicated.

Interior Department regulations (43 CFR 161.5(b)) provide that, in the course of range adjudication, a reasonable portion of the available areas of forage must be set aside for wildlife use. Montana Fish and Game Department recommendations are solicited and considered in determining the proper amount to reserve. The technique for reserving the forage depends upon the type of range survey used. Some surveys automatically exclude wildlife forage without measuring it. This is the case in much of the study area since the surveys were basically concerned with identifying forage to be used by livestock.

Use supervision includes activities such as trespass control and range condition and trend studies. Each District is subdivided into five units and one unit is examined carefully each year, on a 5-year rotation plan, to determine the condition trend of the forage compared to its previous condition. Management on areas which are in deteriorating condition is then modified to halt the deterioration and begin the rehabilitation of the rangeland. This will include reduction or adjustment in stocking rates or seasonal uses. Initiation or intensification of rehabilitation work also takes place.

The most recent range condition and trend studies in the study area disclose the following:

	Good	Fair	Poor	Not Yet Studied	Waste
North of the River	59.9%	50.2%	.02%	8.5%	5.2 %
South of the River	39 %	51 %	9 %	-	1 %

Range improvement activities consist principally of fencing, brush control and reseeding, and provision of stock water. The following table indicates the Bureau of Land Management accomplishments on public lands in the study area to date:

Type	Total Number	Cost BLM	Cost Cooperator	Cost Total
Reservoirs: (Projects)				
N. of River	150	79,500	8,200	87,700
S. of River	90	57,676	10,242	67,918
Fences: (Miles)				
N. of River	133	9,089	45,066	54,155
S. of River	85	8,719	34,324	43,043
Fire Reseeding: (Acres)				
N. of River	90	625	-	625
S. of River	-	-	-	-

(Continued)

Average weight per calf - 400 lbs.
Average weight per cow - 1000 lbs.
Average weight per yearling - 725 lbs. - steer
675 lbs. - heifer

An average price was calculated per pound of beef. This information was obtained at the Lewistown stockyards.

1960 average price per pound of calves - 30¢ - steer
20¢ - heifer
1960 average price per pound of yearlings - 24¢ - steer
23¢ - heifer
1960 average price per pound of cows 5 yrs. and up - 13¢

As the total cattle population of approximately 31,700 head does not include calves, it would be necessary to subtract the 35 calves from the 100-cattle unit. The 65 remaining head of cattle divided into 31,700 head would show that the equivalent of 487 cattle units of 100 head each exist in the study area.

On the basis of the above information, the following table shows beef production:

BEEF PRODUCTION

Type	Total Sold Yearly	Average Wt. Each	Total Wt.	Av. Price Per Pound	Total Production
Range Cows:	3,896	1000 lbs.	3,896,000	$ .13	$ 506,480
Calves:					
Steers	7,305	400 lbs.	2,922,000	.30	876,000
Heifers	4,870	400 lbs.	1,948,000	.26	506,480
Yearlings:					
Steers	4,383	725 lbs.	3,177,665	.24	762,640
Heifers	487	675 lbs.	328,725	.23	75,610
TOTALS	20,941	585 lbs.	12,272,390	$ .22	$2,727,810

On this basis, an estimated $2,750,000 found its way into the local and state economy during 1960 because of beef production of this area. This total varies from year to year but seems to give a reasonable indication of the monetary income to the area from beef production.

Montana's 1959 cash receipts (latest available) were $164,500,000 for the marketing of cattle and calves. Thus, the subject lands, which encompass 1.9 percent of the total land area of the state, marketed 1.7 percent of the state's cattle during 1959-1960.

It should be noted that the 100-head cattle unit was used only to estimate production and that a 100-head cattle unit would have a gross annual income of $8,500. The average of the 111 cattle operations in the study area is larger than this.

Sheep

There are seven sheep ranchers in the study area who run approximately 14,700 head. The largest operator has approximately 5,700 head and is strictly a sheep rancher, whereas some of the smaller ranchers combine their operations with sheep and cattle.

In placing a production dollar value on the total sheep population, the same method used on cattle has been adopted except a 1000-head unit is used. This more closely duplicates a typical sheep operation.

1000-Head Sheep Unit
440 Ewes
450 Lambs
90 Replacement Ewes
10 Bucks
10 Markers (blacks)

Of these, a total of 407 would be marketed on a yearly production basis as follows:

100 Ewes (old, wornout and culls)
300 Lambs
5 Bucks
2 Markers (as needed)

The Billings stockyards provided the average weights and 1960-1961 prices used below in estimating the production values for the entire population of 14,700 sheep, based on the 1000-head unit.

SHEEP PRODUCTION

Type	Total Sold Yearly	Average Weight	Total Weight	Price per 100 lbs. or per animal	Total Production
Ewes	1,463	120 lbs.	175,560 lbs.	$3.50/100 lbs.	$ 6,140
Lambs	4,390	75 lbs.	329,250 lbs.	$14.65	64,310
Bucks	73	120 lbs.	8,760 lbs.	$50.00	3,650
Markers	29	120 lbs.	3,480 lbs.	$3.50/100 lbs.	120
TOTALS	5,955	87 lbs.	517,050 lbs.		$74,220

Wool production estimates based on the total sheep numbers, local averages on pounds per fleece, and the 1960-61 price per pound of wool are as follows:

Total No. of Sheep	Average Pounds Per Shearing	Total Pounds	Price Per Pound	Total Yearly Production
14,635	10.3	151,740	$ .43	$65,248

In summary, an estimated $140,000 found its way into the local and state economy during 1960 from sheep and wool production in the study area. As a means of comparing productivity of the resource between the study area and the state total, the 1959 marketing receipts would have to be used as they are the latest available. The total cash receipts from sheep and wool marketing in 1959 were $20,551,000. Therefore, it follows that the study area, which encompasses 1.9 percent of the state's total land surface, produces 0.7 percent of the state's sheep and wool production.

Montana sheep numbers and wool production have been steadily decreasing over the past years. This trend is undoubtedly affecting the breaks area as well.

Based on the above figures, the 1000-head sheep unit would yield an average annual gross income of $11,200, which would, probably, under present conditions, be too small for an economic unit.

Wildlife

The Montana State Fish and Game Department is responsible for administration of the nonmigratory wildlife resources in the study area, except for that portion included in the Fort Peck Game Range.

Most of the following data was furnished by the State Fish and Game Department. These statistics will not be comparable to similar measurements for the Fort Peck Game Range since only 13 percent of the study area is included in the Game Range. For this reason, State Fish and Game opinions were used when they differed with the Bureau of Sport Fisheries and Wildlife.

Revenues from Hunting and Fishing Licenses
May 1, 1959 - April 30, 1960

Revenues - State of Montana - $1,721,840

Revenue from Blaine, Phillips, Chouteau, Fergus, and Petroleum Counties (Includes study area):

No. of Licenses	Type	Revenues
9,858	Resident Bird and Fish	$ 29,574
7,502	Resident Big Game	22,506
839	Tourist Fishing	2,517

(Continued)

No. of Licenses	Type	Revenues
131	Nonresident Fishing	$ 1,310
16	Nonresident Bird	400
100	Nonresident Big Game	10,000
206	Bow and Arrow	412
1,192	Nonresident Deer	23,840
235	Boat Application	705
20,079		$91,264

Of interest in the above table is the fact that approximately one big game license out of seven and one fishing license out of every nine was purchased by an out-of-state resident.

The following calculated game population and harvest estimates are based on the study area (2,920 square miles):

Big Game Populations and Harvest 1960-1961

Type	Total Population	Population Per Square Mile	Total Harvest	Harvest Per Square Mile	Percent Harvest
Deer	29,200	10.0	2,920	1.0	10
Antelope	2,190	.75	365	.19	25
Elk	200	.06	10	.02	5
Totals	31,590	10.8	3,295	1.21	11

On a state-wide basis for the year 1959-1960, the estimated big game harvest was as follows (145,878 square miles):

Montana Big Game Harvest

Type	Total Harvest	Harvest Per Square Mile
Deer	120,300	.76
Antelope	15,500	.10
Elk	15,000	.10
TOTAL	150,800	.96

Although the big game harvest for the state is for the year previous to the harvest in the study area, this figure varies little from year to year. The study area covers 1.9 percent of Montana's total area yet produces 8.1 percent of the total big game (excluding moose and goat) harvested in the state.

Several interesting observations concerning the various types of big game in the breaks area are pertinent to this report.

Deer

The range condition trend of key wildlife forage species north of the Missouri River is generally upward, while it appears that the range south of the Missouri is being over-used. Sixty-one percent of all deer harvested in the breaks were antlered bucks, while a total of 86 percent of all deer taken were mule deer. The number of hunters in the breaks is increasing yearly. The harvest is likewise on an upswing with the present hunter success slightly over one deer per hunter. White-tailed deer are considered to be under-harvested. The Fish and Game Department is working toward a solution of this problem.

Antelope

Approximately 60% of the permit holders were successful in shooting an antelope. Fawn-doe ratios vary from 89 to 106 fawns per 100 does. Single bucks and herds of bachelor bucks will confine themselves more frequently to the rough terrain (which is predominantly national land reserve) while does and fawns prefer the flatter plains.

Elk

The calf-cow ratio of 51 calves to 100 cows indicates that the break's elk are having excellent reproductive success. Open season, by permits only, is expected in this area within the next few years.

The following estimate of dollars spent by sportsmen to enjoy the wildlife resources in the study area is a very rough projection of rather sketchy data. Its principal value is to show that even under present conditions the area has significance to the state's economy as a public hunting site.

During 1960, it was estimated that 248,000 persons hunted and fished in Montana, of which approximately 32 percent were out-of-state sportsmen. The Montana Fish and Game Department estimated that the average resident hunter and fisherman spends $271 annually, whereas the visiting outdoorsman spends $157 annually, or a combined total spent on hunting and fishing of approximately $60,000,000 yearly. This compares favorably with Montana's other major industries. The following state figures were quoted in 1960:

Total Montana Livestock Receipts	- $202,000,000
Montana Copper Production	- $ 60,000,000
Montana Petroleum	- $ 77,000,000
Total Cash Receipts from Montana Produced Crops	- $176,000,000

Thus, it can be seen that the $60,000,000 that the sportsmen are willing to pay annually to hunt and fish compares favorably with other important Montana activities.

Based on the number of big game harvested in the study area and hunter success, it is estimated that approximately 5,000 hunters and fishermen use the breaks area under present conditions. Assuming that one out of seven outdoorsmen is an out-of-state visitor, as shown by the sale of licenses in the counties involved, the following figures have been compiled:

700 Non-residents @$157 = $ 109,900
4300 Residents @$271 = $1,165,300
TOTAL $1,275,200

These figures are based on reasonable estimates and serve to show the importance of hunting and fishing in the study area. The total of $1,275,200 is 2.1 percent of the state's total dollars spent on hunting and fishing for an area that is 1.9 percent of the state's total.

Big Game vs. Livestock

A study conducted by the Montana Fish and Game Department, identified as Project No. W-98-R-1, was made over the period of June, 1960, to May, 1961, to determine the food habits and range relationships of big game to livestock in the Missouri Breaks area. The study, although quite preliminary, showed that the possibility of competition between livestock and big game does exist but only when there are an excessive number of a particular animal for its particular forage source. Under normal conditions, excluding drought or unfavorable range conditions, the normal forage preferences, range use patterns, distribution, and movements tend to limit the changes for competition.

This study and preliminary finding was obtained by recording frequencies of plant use by various species at feeding sites where a combination of mule deer, elk, and livestock intermingled. A total of 13,222 observations were made, 5,815 deer, 1,392 elk, and 6,015 cattle, on which the following tentative range relationships were based:

Mule Deer - Elk: The food habits data for deer and elk indicate possible competition for forage between these two species. Food habits overlap during the spring, summer, and early fall. Forbs and new growth of grasses are important in the food habits of both species during early spring and could effect a measure of competition, especially during drought years when forb growth is limited. Elk also utilized several browse species which were heavily used by deer. However, the importance of these species to both deer and elk has not been determined and it is possible that dual use would be important only under conditions of drought or excessive numbers of deer, elk, or both on the range.

Mule Deer - Cattle: Broad differences in food habits, distribution, and range use patterns would appear to minimize conflict between deer and cattle. As a rule, cattle utilized grasses predominantly and the major portion of the deer diet was browse. However, during certain seasons and under some range conditions, cattle appeared to utilize considerable quantities of browse to the extent of reducing deer forage supplies. This conflict may be alleviated with good range conditions and proper stocking of both species. Both cattle and deer utilize large quantities of forbs in spring and summer, with forbs being particularly significant in the deer diet. Dual use of this forage source, especially under drought conditions when forb growth is limited, may result in competition. Grass use by deer never appeared to be significant, consisting mostly of new green growth during the early spring prior to the time most cattle are returned to the range.

Elk-Cattle: Elk and cattle food habits are more nearly the same than either deer and elk or deer and cattle, and the opportunity for marked competition exists. However, seasonal differences in forage preferences, range use patterns, distribution, and movements appeared to substantially reduce chances for conflict. Grasses appeared to comprise the bulk of cattle forage throughout the year, with some use of forbs during the spring and summer. Elk food habits data indicated that grasses are important only during the late fall, winter, and early spring when most cattle were off the range. Brief periods of overlap in grass and range utilization thus occur only at the onset and prior to the end of the grazing season. There is, however, some evidence to indicate that the overlap in periods of grass use may be extended considerably under drought conditions when forb production may be severely limited. In addition to food habit differences, elk-cattle range use patterns appear somewhat different. Complete tabulation and analysis of existing and additional range use data will be necessary to determine similarities and differences in this respect. However, elk appeared to move freely and widely between different range areas during most of the year and distributed their forage utilization over large areas. Although the principal elk winter forage was western wheatgrass, which also appeared to be the most important cattle forage species, elk winter feeding areas appeared to be primarily range areas which received little or no cattle use due to lack of water.

Watershed

The Bureau of Land Management is responsible for watershed management on public lands under Bureau administration. This is composed of activities such as construction of runoff detention dams, erosion control structures, waterspreading systems, and other structures and practices designed to reduce erosion to a reasonable minimum and to make the most beneficial use of precipitation falling on the area. The Bureau has never been appropriated funds to contribute substantially to watershed management in the study area, and this situation is more fully discussed in the following PROBLEMS section of PART II.

Crop Production

The production of crops in the study area is an individual farmer responsibility. No public lands are used or are known to have the potential for crop production. The actual farm production is quite difficult to obtain in the study area as the cultivation schedule of the individual farmer or rancher may vary with drought conditions, financial backing, price fluctuations, crop rotation, etc. However, in order to obtain an estimate of this production, a check was made of the dependent property surveys of a representative group of grazing permittees. The following table shows the acreages of crops under cultivation. It should be noted that well over 99 percent of the entire land in the study area in not irrigated. Some of the crops raised by the permittees were for their own use as livestock feed, and, consequently, there is a duplication in the total production statistics for the study area.

CROP PRODUCTION

(Based on the review of approximately 1,192,200 acres - 65% of total land)

Crop	Acres Cropped Per Year*	Average Per Acre Yield**	Average Crop Value	Total Value
Wheat	2,308	11 Bushels	$1.70 Bushel	$ 43,160
Rye and Barley	431	15 Bushels	.75 Bushel	4,850
Oats	717	20 Bushels	.60 Bushel	2,720
Corn (Silage)	170	3 Tons	6.00 Ton	3,060
Corn (Fodder)	237	3 Tons	6.00 Ton	4,260
Crested Wheat Hay	5,102	3/4 Ton	18.00 Ton	68,870
Small Grain Hay	4,492	3/4 Ton	18.00 Ton	60,640
Native Hay	1,823	3/4 Ton	18.00 Ton	24,600
Alfalfa Hay	6,966	3/4 Ton	18.00 Ton	94,030
Sweet Clover	148	1½ Tons	11.00 Ton	2,440
TOTALS	22,394			$308,630

*Does not include summar fallow acreage.
**Montana Agricultural Statistics, County Agents, Individual Ranchers.

Projecting these totals to cover the entire subject land would increase the acreage under cultivation by 13,152 acres and the production value by $181,260. Therefore, it is estimated that 35,500 acres, or 1.8 percent of the study area, is under actual annual farm crop production, and the total value placed on annual crop production would be approximately $500,000. This would mean that the annual production value per acre is $13.81, which is far below the state-wide average of $29.29 on nonirrigated land between the years 1950 and 1959.

Most of the cropland in the study area is dryland and summer fallow must be practiced for small grain production. It is estimated that 8,000 acres are summer fallow, which would raise the total land under cultivation to approximately 44,000 acres or 2 percent of the total lands in the study area.

Minerals

The Bureau of Land Management is responsible for administering the mineral leasing and the general mining laws as they relate to the public lands in the study area. The Bureau is also responsible for the sale of mineral materials, such as sand and gravel.

The Missouri River Breaks Area between the Musselshell and Judith Rivers contains few potential mineral resources. None are being commercially extracted at the present time. This is not surprising in view of the area's unfavorable geologic conditions.

The surface bedrock consists only of sandstone, shale, and clay. There are no mountainous uplifts which might expose valuable vein minerals such as gold, silver, lead, zinc, and copper. In adjacent areas, potentially valuable bentonite clay deposits are found in the Bearpaw and Claggett formations. These formations comprise the surface bedrock over most of the breaks. A field investigation of the many outcrop areas may discover bentonite deposits which, under favorable economic conditions, could be developed into important bentonite reserves. Although this is the only mineral known in the area which can be located under the United States mining laws, two leasable minerals, coal and oil, may have a future.

Some of the older technical publications of the Geological Survey very briefly mention the presence of coal mines in the breaks area. These mines apparently are in coal beds in the Judith River Formation. The beds outcrop or are at reasonable mining depths in the approximate west one-half of the area. The mines probably produced coal for local consumption only. In one instance, near the common corner of Blaine, Phillips, and Fergus Counties, a coal mine furnished the fuel for a power plant. The mine and ruins of the power plant still can be seen on the north side of and only a short distance from the Missouri River channel.

Most of the oil and gas exploration activity appears to be limited to two locations: (1) An area of small structural domes in the southern and southeastern foothills of the Little Rockies, and (2) to the north of Winifred in the southwestern part of the breaks. Niether area now has producing wells, but the domes of the Little Rockies have not been fully explored. This fact, together with the obviously favorable structural conditions, indicates that the area should be considered as potentially favorable for oil and gas production. This irregularly-shaped area is described as follows:

T. 24 N., R. 23 E., PMM, Secs. 1-4, 10-12 (inclusive); T. 25 N., R. 23 E., PMM, Secs. 15-17, 20-22, 25-29, 32-36 (inclusive); T. 24 N., R. 24 E., PMM, Secs. 1-17, 20-24 (inclusive); T. 25 N., R. 24 E., PMM, Secs. 29-36(inclusive); T. 24 N., R. 25 E., PMM, Secs. 1-22 (inclusive); T. 25 N., R. 25 E., PMM, Secs. 13-15, 22-27, 31-36 (inclusive); T. 24 N., R. 26 E., Secs. 2-10, 16-18 (inclusive); T. 25 N., R. 26 E., PMM, Secs. 2-11, 14-24, 26-35 (inclusive); T. 26 N., R. 26 E., Secs. 26-35 (inclusive).

The Winifred area includes all land north of T. 20 N. to the Missouri River and all land west of R. 22 E. to the Musselshell River. In this area during the period 1938 to 1941, four gas wells were drilled whose production was too small for commercial purposes. Other wells drilled had a show of oil and gas. In spite of this, the area should be considered as having some potential since the great majority of the wells bottomed in the Cretaceous horizon, leaving a number of older horizons still to be tested.

Uranium was prospected for in the Bearpaw formation during the uranium boom of 1955-1956, but no extensive deposits were found.

Timber

The Bureau of Land Management is responsible for management and protection of timber resources on public lands in the study area.

Trees in the breaks are generally limited to the Missouri River bottom and the coulees draining into the river. In some places, the coulees will extend 20 miles or more into the surrounding flat plains with vegetated canyons as much as 6 miles wide. It is estimated that approximately 25 percent of the land surface is forested to some degree.

A hundred years ago the timber in this area was utilized by the "woodhawks" to supply fuel for the steamboats traveling the Missouri. At the turn of the century, the timber in the area was again harvested by homesteaders in their quest for house logs and fence posts. As the breaks represented the only timber resources for quite an area to both the north and south, people relied quite heavily on them. As a result, the more desirable and easily accessible timber was cut.

The cottonwood stands on the river bottom were included in homestead development, and one-time stands of cottonwood are now rolling fields of grain or alfalfa. Also, the development of the Fort Peck Reservoir flooded some of the river bottom and adjoining coulees, leaving its mark of dead trees.

Uncontrolled early day use and occasional forest fires sweeping through the area have prevented the breaks from reaching its timber potential.

Cottonwood and willow are the predominant species along the Missouri River Valley with a mixed coniferous cover of ponderosa pine, Douglas-fir, and an occasional juniper in the coulees and on the broken terrain above the river. The cottonwood, which is a relatively fast-growing tree, is now again of merchantable size where stands exist adjoining the Missouri River. However, little market exists, and it may have more value today for watershed protection.

The larger ponderosa pine and Douglas-fir average about 12 inches D.B.H. However, with the sparse amount of precipitation and unfavorable type of soil, it is estimated that it would take a tree at least 150 years to mature to an estimated 15 to 18 inches D.B.H.

Timber sales from public lands in the past 5 years amounted to approximately $2,000, consisting primarily of sales of poles, posts, and Christmas trees. It is not anticipated that an increase in demand of the forest resources of the area will occur in the immediate future.

In summary, a commercial timber resource potential does exist but is not of any great magnitude. The timber is much more important as a scenic asset and as shelter for livestock and wildlife. The Bureau of Land Management is most active in the field of fire presuppression and suppression.

Summary Comparison of the Area's Resource Use Returns to the Economy

In an effort to show the importance of the study area on a dollar basis, the following table was prepared which identifies the various contributors to the local and state economy:

Item	Yearly Market	Percent of State's Market* (Study area contains 1.9 percent of state's surface area)
Beef Production	$2,750,000	1.7
Sheep Production	75,000	0.7
Wool Production	65,000	0.9
Crop Production	500,000	0.08
Hunting and Fishing	1,275,000	2.1 **
TOTAL	$4,665,000	

*Based on 1959 cash receipts from farm marketings which totaled $403,622,000.

**1961 figures from "Montana's Hunting and Fishing Dollars," Department of Fish and Game publication.

RECREATION

To the nation at large, Montana spells the West and the vacationland for some three million out-of-state visitors. For the most part, Montana's recreational resources are found along the Rocky Mountains in the western portion of the state. Here the scenery and refreshing summer climate, forests, wildlife, mountain lakes and streams, and the wilderness quality still retained by much of the area makes this mountainous section an attraction to tourists and vacationers alike.

The eatern half of the state, by sharp contrast, is a typical portion of the Great Plains with a very few natural scenic areas of significance. The breaks adjoining the Missouri River is one such potential recreational area within the Great Plains region. As Captain Merriweather Lewis wrote in 1805 of this area, "The water in the course of time descending from those hills and plains on trickled down the soft sand cliffs and worked it into a thousand grotesque figures which, with the help of a little imagination,gives the appearance that nature has attempted to rival the human art of sculpturing." This truly describes some of the extra-ordinary geologic formations of the breaks area, which is just a portion of the total recreational value. The beautiful Missouri River, with its rich history of the Lewis and Clark expedition, was at one time a main artery to the northwest. It retains some reminders of the trapping, trading, and Indian eras. For the present day, a variety of fish await the fisherman's conquest. Here, also, is an abundance and variety of many of America's typical wildlife resources and the relatively unchanged wilderness that the first white man observed in his search for riches. It is a recreational area of significant potential.

Existing Recreational Developments

There is only one developed recreational area within the study area proper - the James Kipp State Park located at the intersection of the Missouri River and Montana State Highway 19. The park was constructed in 1960 with the completion of the Robinson Bridge over the Missouri River. The park, which is located on approximately 15 acres on either side of Highway 19, has facilities for about 15 family units, complete with water and sanitary facilities. The park register was signed by 2,300 people between April 7 and October 1, 1961, of which 15 percent were by out-of-state visitors. Canadian visitors made up approximately 50 percent of the out-of-state total. When one considers that approximately one out of four visitors will sign a register and those using the site on several occasions will only sign it once, it can be seen that this roadside park may have been visited by up to 10,000 persons this year.

Fort Peck Reservoir, which lies to the east of the study area, is 189 miles long, up to 16 miles wide, and has a shoreline of 1,600 miles. It provides northeastern Montana with a large variety of water activities, including boating, water skiing, fishing, picnicking, and camping. Fort Peck Dam is a must for sightseeing visitors as it is the world's largest hydraulic earth-fill dam. The most important use months are June, July, and August. In this time approximately 105,000 people visited the reservoir area. Eight intensive recreational developments at various locations surrounding the reservoir are operated by the Montana Highway Commission, Corps of Engineers, and local organizations.

Because the reservoir adjoins the eastern boundary of the study area, it does have an effect on the demand being made of the breaks. To what degree is impossible to tell in view of the present inaccessibility of the breaks area, the different type of recreation obtainable at each of these areas, and the lack of any direct public access route from one area to the other.

Present Recreational Use

Recreation as it applies to the study area is generally restricted to the Missouri River and the rough breaks adjoining the river. The flat plains, on the other hand, are usually associated with the intensive ranching operations with very limited recreational activity.

Hunting, by far, is the most important single recreational use being made of the breaks at the present time. However, hunting use has been discouraged and, in inclement weather, almost eliminated due to limited access. As pointed out in the wildlife section of this report, approximately 10 percent of the deer population is harvested yearly, which is far below accepted adequate harvest standards.

Waterfowl hunting is becoming increasingly popular in the breaks area, both in the waterholes on the flat areas on either side of the breaks and along the Missouri River. Instances of floating geese and duck hunts indicate a popularity in this sport.

The study area lies across the central flyway, which makes it desirable for the waterfowl hunter. Although no figures of actual populations or harvest could be obtained for the study area, the following calculated waterfowl harvest table provides an indication of the importance to the state of the five counties which include the study area. These figures are based on resident hunters only between the period of May 1, 1960, to April 30, 1961 (State Department of Fish and Game Project W-71-R-6 through W-77-R-6.)

WATERFOWL HARVEST

Area	DUCKS Hunters	 Ducks Harvested	 Ducks Per Hunter	GEESE Hunters	 Geese Harvested	 Geese Per Hunter
Blaine, Phillips, Chouteau, Fergus & Petroleum Counties	1,695	8,657	5.11	1,412	1,274	.90
State of Montana	20,527	97,225	4.59	7,168	4,265	.59
Percent of State's Total in 5 Counties	8.2	8.9		33	30	

It should be noted that the average number of days hunted was 4.46 for ducks and 3.45 for geese.

Phillips County was the most important county in the state for the goose harvest while none of the five counties were among the top five counties in the state's duck harvest.

Fishing within the study area is generally limited to the three ferry crossing sites and the Robinson Bridge area, which are the only areas where access may be gained quite easily.

In 1959, the Bureau of Sport Fisheries and Wildlife of the Fish and Wildlife Service compiled a Fishery Classification Map based on the availability, aesthetics, use, and productivity of the various streams throughout Montana. This study was undertaken in an effort to measure and present the total fishery value - both economic and social. The streams were placed into one of the following categories:

Class 1 - Streams of national as well as statewide value
Class 2 - Streams of statewide value
Class 3 - Streams of value to large districts of the state
Class 4 - Streams of value to small districts, such as counties
Class 5 - Streams of restricted local value or not yet classified

Three streams within the study area were included in the fishery classification map. They were as follows:

Missouri River - Class 4
Judith River - Class 3
Cow Creek - Class 4

The Missouri River, which flows the length of the study area from west to east, is of primary importance to the study area. This stretch of the Missouri River was rated as a Class 4 stream primarily on its availability and use. As can be expected from an area which is as remote as this, access is very poor. There are no accommodations, such as motels, and few campsites. No population centers are within its close proximity. Therefore, very little use has been made of the Missouri River except by the sparse local population.

Fish species in the Missouri include sturgeon, sauger, northern pike, sunfish, crappies, numerous species of catfish, yellow perch, suckers, goldeye, carp, rainbow trout, and brown trout. By far the most abundant species seems to be the goldeye, which is not a desirable fish by fisherman's standards. Perhaps the most often sought are the catfish and the sauger, which is quite similar to the walleyed pike. Trout represent a small fraction of the fish population and are usually caught in early spring months. Some bass and crappies have been stocked in the larger livestock water reservoirs.

Fishing is allowed on a year-round basis in the Missouri, which further points to a river with an excessive fish population and lacking fishing pressure.

Each year a group of local sportsmen organize a float trip down the Missouri River. It originates at Fort Benton and terminates at Fort Peck some 300 miles downstream. This trip is quite interesting as it covers the same route that Lewis and Clark used on their expedition in 1805. For over 100 miles of this trip, the setting still remains in much the same state as when Lewis and Clark first saw this country. The remainder of the trip is over the Fort Peck Reservoir where motor power is required to complete the trip.

Although the vacationer is a rarity in this area, a certain amount of Indian artifact hunters, rockhounds, picture-takers, and sightseers do visit the breaks. A check at the ferry crossings disclosed that approximately 1,000 cars use the ferries during the average summer month, of which approximately 125 had out-of-state license plates. The average car carried 2 1/2 people, which would place an out-of-state visitation figure of 315 people per month now using the "back roads" of the study area. The large majority of Montana users were local people.

In summary, the present recreational demand being made of the breaks area is very light. This is due, primarily, to the inaccessability of the area and the apparent lack of knowledge of the existence of the recreational potentialities.

Recreation Potential

The Missouri River and breaks immediately adjoining the river have a tremendous recreation potential, whereas the remainder of the study area, which involves roughly 60 percent of the land area, is probably static in its recreational pressure.

The greatest asset to this region is the existing state of semi-wilderness. There are only a handful of cabins, ranches, and roads in the entire area. This asset, and the rich history of the area, will require conservation and development in the strictest sense of the word. Here is an area that has virtually remained unchanged since the days of our earliest settler and the route of Lewis and Clark in 1805 but, at the same time, is the basis for an active ranching economy. The only visable change is an occasional fence or ranch headquarters.

Three major types of recreational uses could be made of this area:

Float trips down the Missouri River which could originate and terminate at several locations, making 1 day to 1 week trips possible. Several camping and picnic areas at these locations, as well as campsites along the river, would enhance this type of recreational use.

Lewis and Clark used the Missouri River in their famous expedition to the Pacific Ocean in 1804-1806. Their journals describe the river and adjoining breaks in much the same manner that it may be viewed at the present time, which is unusual considering the 150 years which have elapsed since their trip. This unique historical feature can be preserved, yet still made available for public enjoyment, through the use of float trips and generally restricting access to the river, thereby retaining the river and lands adjoining it in a state of semi-wilderness.

The float trip on the Missouri will afford the traveler with a varied assortment of recreational enjoyment. Here, each individual may obtain the type of recreation they are particularly seeking. To some, the mere thought of traveling the Lewis & Clark route will satisfy their desires, while others may prefer the simple scenic solitude of the semi-wilderness. However, to the majority of the people, any one of the following types of uses are available: Fishing, hunting, swimming, picture taking, hiking, camping, artifact hunting, and exploring.

Extensive fishing and hunting throughout the study area could be afforded the general public. Accurate maps of the area, better access, developed hunting and fishing sites and closely coordinated fish and game projects would provide the rabid outdoorsman a wide variety of activities.

General recreation facilities could be provided for the city dwellers who like to picnic at established campgrounds, stay within sight of their car, fish with a bobber, and tell relatives of their vacation in the Western Wilderness. Here the interpretive program of explaining the why's and wherefore's of American history and nature's phenomenon can best be utilized.

STUDY AREA PROBLEMS

Access

Montana State Highway 19, completed in 1960, is the first and only paved highway within the boundaries of the study area. This highway follows a north-south route between Malta and Big Timber via Lewistown and Harlowtown. The Robinson Bridge, which is part of Highway 19, also completed in 1960, became the first bridge over the Missouri River in the study area.

One secondary road, Highway 236, and two county roads also traverse the study area, relying on ferries for crossing the Missouri River. It should be noted that two of the ferries are county-operated and operate between 7:00 a.m. and 7:00 p.m., as long as the river is free of ice. There is also one private ferry in operation just above the Fort Peck Game Range. It is estimated that approximately 1,000 cars are carried across the Missouri by the three ferries during the summer months.

In addition to the main arteries described above, there are many "Jeep" or 4-wheel drive roads and trails throughout the area. Most of these have come into existence merely through constant use by the rancher and the hunter. Under ideal conditions, a passenger car may be used in driving these roads. However, the "gumbo" soil will turn into a sea of mud when moistened and cannot be traveled by conventional vehicles.

No up-to-date road maps of this area are available, and the few roads that do exist are not properly marked. Also, the roads usually pass through many range gates and private property which adds to the general access problem of the area.

The poor access situation affects the Bureau of Land Management's programs in several ways. It is extremely difficult to administer the national land reserve when access is blocked or lacking completely. Such things as range trespass, range surveys, soil and moisture programs, range rehabilitation, fire presuppression and suppression, hunting access, and recreational development tend to bog down under the inconveniences of this access problem. The access problem stands out as the most important single obstacle that must be overcome before full utilization of the breaks area can be fulfilled.

Land Tenure

Almost every time a needed structure or management practice is proposed, land tenure becomes a critical factor. Usually, in order for a practice to be efficient and effective, practically all of the susceptible geographic area must be included. Often, however, several ownerships are encountered, easements and financing prove to be impossible, and a needed program often must be abandoned. The only way to alleviate this situation is to consolidate ownerships and to remove unnecessary and overlapping administration.

Another significant land tenure problem is the lack of general public knowledge regarding the location of public lands, or even the location of the Missouri Breaks. These public lands have the same problem of anonymity that is associated with many national land reserve areas. Only the day to day users, such as the range operators, know the boundary lines. Multiple use is impossible until public land areas can be identified and access provided.

Finally, once the area is known and public access (both legal and physical) achieved, the land pattern must be solid enough to permit general public use without the constant problem of trespass on intermingled private lands.

Fire Protection

Two primary problems face the Bureau of Land Management's fire control organization. One is the difficulty of immediate detection. This can be very detrimental because of the potential rate of speed which a fire can travel in the break's fuel types. The other is the access problem. Although a fire may be known, the existing road system often will not permit a fast, direct trip to the site of the conflagration. Fire damage in the breaks is quite serious due to the soil's extreme susceptibility to accelerated erosion.

Erosion and Watershed Control

The breaks area offers a gigantic illustration of geologic erosion, or the normal wearing down of the earth's surface. However, it is also highly susceptible to accelerated erosion, caused by undue disturbance of the surface vegetation by overgrazing, drought, fire, etc., with the resulting damage to the land resource and to downstream facilities.

Control of accelerated erosion, in an area such as the breaks, requires control of runoff on an individual watershed basis. This has not been possible with past Bureau of Land Management appropriations.

Accelerated erosion, over the past 10 years, has not been a serious problem. However, it was severely damaging during the drought years of the

1930's when vegetation was insufficient to control flash floods. This situation could be repeated, since control structures still do not exist.

Range Depletion and Deterioration

This area does not have a severe range deterioration problem, similar to those existing in many parts of the west. In fact, considering the varying conditions the range has experienced, today's condition is reasonably good. However, isolated problems remain. Lack of sufficient stock water facilities has created extensive "sacrifice" areas around existing water where the grass is severely over-grazed. Additional fencing and adoption of rotational grazing is needed to balance out areas of over and under use. The recent drought has decreased range condition, and if it had continued, substantial stocking cuts would have been necessary to protect the forage.

Cattle trespass is not uncommon. Private operators will encroach on the federal land by allowing their livestock to graze on the federal range beyond the expiration dates of their permits, or by placing more livestock than are allowed on the range during the permit period. This illegal use of the range is definitely over and above that which is allowed, and it affects the total depletion picture. Trespass is very difficult to control in the breaks area because of the large common allotments (south of the river) and poor access, especially in the winter when roads are nearly impassible.

In some areas the range is becoming infested with undesirable plants such as annual sunflower, fanweed, fringed sage, and lower quality grasses. Undesirable infestations could change the carrying capacity, range use, and make the forage less desirable for the grazing of livestock and/or wildlife.

Wildlife

More intensive harvests are urgently needed to insure adequate conservation of the mule deer and its corresponding range. This can be illustrated in the Crooked Creek area south of the Missouri River where the Department of Fish and Game determined that a minimum harvest of five deer per square mile should be attained. Actual harvest varied from less than one deer per square mile to three deer per square mile, depending on the accessibility of the area.

White-tailed deer present a problem of lack of hunter success. Because of the alertness of this deer and the relatively easy manner in which mule deer may be taken, most hunters use their permit for the mule deer species.

Although the elk population is presently very minor for the area and the available forage, a minor problem does exist which may increase as the population grows. This is the elk migration to private lands. Since elk compete directly with cattle, private land owners have a legitimate complaint.

Most of the wildlife problems in this area would be greatly alleviated by development of access, an information and education program, better cooperation between the rancher and hunter, and establishment of appropriate wildlife forage reserves where they do not now exist.

PART III - PROPOSED BUREAU OF LAND MANAGEMENT ACTION

LAND TENURE ADJUSTMENT

RESOURCE MANAGEMENT AND DEVELOPMENT

RECREATION MANAGEMENT AND DEVELOPMENT

Estimate of Recreational Use

Recommended Land Acquisition

Recommended Further Study

PART III - PROPOSED BUREAU OF LAND MANAGEMENT ACTION

The Bureau of Land Management administered lands in the study area are now utilized on a limited multiple use basis. Their greatest potential lies in the continuation and increase of this type of use. The principal limitation to fuller multiple use is the lack of access. It makes a substantial contribution to the state's economy. The major contribution comes from livestock and agricultural production, with income from wildlife harvesting falling next in line. Substantial potential for increased returns lies in the recreation and wildlife sector. The public land in this area has a highly unstable soil and has no known crop production potential. It requires management and protection which appears to exceed the level which can be supported by on-site benefits. It needs this form of management to protect downstream river structures from sedimentation, to preserve the wildlife habitat, and to make the area available for public use.

The Bureau of Land Management should greatly intensify its multiple use management and development program. This program should be directed toward solving the previously identified problems. It should be directed toward maximizing the economic returns from the resources involved. This may require reduction in existing domestic livestock use if additional wildlife use will make a greater net contribution to the area's economy. It must also be sufficiently flexible to accomodate other agency activities if specific resource management needs should so dictate. These activities could take the form of multiple purpose reservoirs, national parks, or national wildlife refuges.

Consequently, the program proposed for this area has these characteristics:

LAND TENURE ADJUSTMENT

An area within the study area has been selected for intensified management. It has a simple boundary, encompasses most of the studied public land, and eliminates much of the private land. It should be called the Missouri Breaks National Land Management Area and publicized as such.

The following lands are encompassed:

Public Domain Lands	- 925,510
Land Util. Proj. Lands	- 52,910
State	- 102,800
Private	- 429,350
Other	- 21,280
Total	1,531,850

This action will give the public land an identity, will make it known around the state and nation, and will be the first step toward achieving full multiple use.

The land pattern should be consolidated and improved in any way possible to better support resource management programs. These adjustments can be made by means of private and state exchanges under Section 8 of the Taylor Grazing Act. The general pattern of adjustment would be directed toward solid federal ownership in the rougher breaks area where the above-discussed problems are most severe.

All existing withdrawals must be reviewed to determine their necessity in view of the National Land Management Area designation. To eliminate duplication of administration and to provide uniformity of management for the Missouri Breaks area west of the Musselshell River, the proposed Bureau of Land Management intensive management unit should include that segment of the Fort Peck Game Range lying within the unit boundaries. (This does not include the possibility of a limited migratory waterfowl refuge along the river.)

The game range was established to preserve habitat for antelope, sharp-tailed grouse, and other species of wildlife needed to maintain a balanced wildlife population. This action was taken shortly after passage of the Taylor Grazing Act. At that time, control or management over the use and disposition of the public domain had not yet become established and demonstrated to the public. The Bureau of Land Management is now in a position to extend the wildlife habitat protection needed to the game range area and is doing so, under the principles of multiple use, on adjacent public lands outside of the game range. No actual change in use would result since livestock grazing is now permitted in the game range under Bureau of Land Management administration.

The wildlife species now using the game range are under management by the State Game and Fish Department elsewhere in the state, and it appears that the state agency could adequately assume full responsibility for this function on the game range.

Modification of the game range as proposed would greatly simplify management in this area, leaving the Bureau of Land Management with the responsibility for managing the surface and sub-surface resources and the State Fish and Game Department with the responsibility for managing the wildlife resources.

RESOURCE MANAGEMENT AND DEVELOPMENT

Resource management and development is discussed in a summary fashion. It is the Bureau of Land Management's most substantial activity in this area, and a separate study and management plan will be needed to fully plan and implement the action necessary.

Range adjudication should be completed in the shortest possible time. Individual allotments must be established and fenced. Adequate provision for wildlife forage should be made in the approved stocking rates. Range condition and trend studies must be continued and accelerated. Rotational and deferred grazing should be adopted, where possible, to make the most efficient use of available forage.

Substantial development in the nature of watershed protection, stockwater, reseeding, fencing, and truck trails should be undertaken. We have estimated the National Land Management Area's total needs of this type to cost approximately $2,000,000. Under present cooperative practices, the Bureau of Land Management would pay $1,900,000 and the remainder would be contributed by resource users.

All-purpose access roads are required throughout the area to serve the various management activities such as range management, timber management, fire control, and wildlife management. They are also needed to open the area up to general public use for recreational purposes.

A final estimate of road location, type, and price cannot be reached until the nature of the river development is known and substantial engineering studies are made. At this time, to give an idea of the magnitude of the general purpose access road network needed, a generalized plan has been prepared. It involves the following construction:

(1) 135 miles of existing unsurfaced roads would be surfaced with three inches of gravel. Some grade and drainage improvement would be required. Cost, @$5,000 per mile, would be $675,000.

(2) 210 miles of new roads would be constructed and surfaced with 3 inches of gravel. These roads will have a maximum grade of 10 percent and would be drained. Cost, @$7,000 per mile, would be $1,470,000.

Total Estimate - $2,145,000

While wildlife management is a function of the State Fish and Game Department, close cooperation is necessary to achieve a proper degree of forage utilization. Wildlife management problems are now centered around the fact that there are large numbers of deer per square mile. Deer numbers are rather high because of poor access to the area during the hunting season. Hunting pressure has not been great, although seasons have been long. Provisions of more adequate access, and generation of increasing public awareness of the area's hunting potential should help in this regard.

Timber management is not considered to be a significant program in this area, as far as commercial harvest is concerned. However, the existing timber has substantial value for watershed protection and wildlife habitat, and should be conserved for this use.

Fire control should be continued and the Bureau's readiness to combat fire increased. Better facilities for spotting fires are necessary, and improved access is needed to quickly get new equipment to fires when they start.

RECREATION MANAGEMENT AND DEVELOPMENT

Development by the Bureau of Land Management should be designed to enhance and support the type of multiple-use management best suited to the breaks area. In this respect, if Congress or the Secretary of the Interior concludes that the highest and best use of portions of the breaks area is a dam site, wilderness area, or a national park, the Bureau's proposed action would be changed substantially to achieve full multiple use of the lake or other facilities which would be created.

As outlined in the recreation potential section of this report, there are three major types of recreational uses that can be made of the breaks area in its present state. These are: The float trip down the Missouri River, extensive hunting and fishing, and general recreation. To properly accommmodate these three types of use and to provide a management and development plan alternative in the event the reservoirs or the National Wilderness Waterway proposals are not achieved, the following is proposed:

> Three parks and four campgrounds, as shown on the attached map, should be constructed. The parks would accommodate most of the people using the river for float trips as well as the general tourist. Here, trailer stalls, campgrounds, picnic sites, and all the necessities to complete a successful week-long outing or an afternoon picnic would be made available. In addition, they provide the necessary access to the Missouri River for those seeking floating ventures. Judith Park at the western end of the breaks would serve as the "jumping off" spot for river travel, while Musselshell Park at the eastern edge of the breaks would be the terminous of the float trip and the launching area for use on the Fort Peck Reservoir. Each of the campgrounds and the James Kipp Park at Highway 19 would also provide for outdoor camping and ramp facilities for those favoring shorter float trips.
>
> Minor development, principally in the form of an interpretive program is recommended for four historical and archeological sites. These are also shown on the attached map.

A buffer area approximately two miles back on each side of the river would be recognized in all other resource management plans. This buffer strip would remain undeveloped and generally in its present state. Watershed control structures would be out of sight and access roads would run out to the points of the breaks and not down the drainages to the river. Livestock would still be permitted to water in the river. In this way, the setting which would be most interesting to the recreationist would be preserved.

A posting program to identify the main access arteries of the entire breaks area is required. These will be simple road signs keyed to a map covering the National Land Management Area. The map would also show the key recreational areas. On the reverse side of this map special instructions for the use of the breaks would be printed, i.e., safety, liability, cooperation with ranchers, etc., as well as a description of the Bureau of Land Management and its responsibilities.

The access road development program needed to provide passenger car access to the developed sites as well as access into areas where hunting and sightseeing are the primary uses, is discussed above under RESOURCE MANAGEMENT AND DEVELOPMENT.

An initial program of recreational facility development would cost approximately $170,000. This would provide for minimum facilities at the sites designated below, and would make the above-described recreation program possible. Substantial additional investment would be needed to expand and improve these facilities as their yearly use increased.

Judith Park	- $ 30,000
James Kipp Park	- 17,000
Musselshell Park	- 24,000
Davies Campground	- 19,000
Woodhawk Campground	- 19,000
Beauchamp Campground	- 11,000
Carroll Campground	- 11,000
Fort Musselshell Historical Site	- 6,000
Lewis & Clark Historical Site	- 2,000
Fort Cook Historical Site	- 8,000
Indian Groves Archeological Site	- 5,000
General Sign Posting for Land Management Area	- 15,000
TOTAL	$167,000

In addition to the interpretive signs, parking facilities, etc., this cost will include picnic facilities for 52 family units, camping facilities for approximately 120 trailers and tents, 15 miles of road immediately adjacent to the recreation areas, and 9 boat launching sites.

The road posting program is estimated to cost $15,000, which would place signs on all roads at the gateway to the Land Management Area as well as interpretive and informational signs at strategic locations throughout the area.

Estimate of Recreational Use

Potential annual visitor attendance calculated to use the breaks area is extremely difficult to judge because of the relative unawareness of this area in the past. For this reason, the breaks must be considered a newly-opened area for public use offering a unique type of recreational use that will increase its popularity primarily on its own features to attract future use.

Certain conclusions can be reached in regard to the "area of influence" that the breaks will affect. It is estimated that the breaks have an intensive recreational influence over an area extending 50 miles surrounding the boundaries of the breaks. This area, which is designated as Zone A, includes the towns of Lewistown, Winnett, Malta, Fort Benton, Havre, and several smaller, sparsely populated communities. Within this entire zone, it is estimated that a population of 12,000 exists, according to the 1960 census. It is expected that the post-project population will have increased in this area by 10 percent, or approximately 1,000, which would place the population near 13,000. Of this number, it is estimated that approximately 25 percent or 3,200 may visit the breaks annually from Zone A for recreational purposes.

From beyond Zone A and including the remainder of Montana, identified as Zone B, it is calculated that occasional visits may be received from all of the cities and towns in the state. Foremost of these would be the cities of Billings, Great Falls, Roundup, and Harlowton, which do not have the outdoor recreational attributes associated with the western portion of the state. It is expected that 5 per cent of the state's 675,000 population, or approximately 33,000 will annually visit the breaks area for recreational purposes.

Zone C represents the remainder of the area from which visitors may originate. It is believed that, because of the varied type of recreation available and the historical value of the Missouri River, the breaks will attract considerable out-of-state traffic from the east-west routes of U. S. 2, 10, 87, and Montana State Highway 20. In addition, north-south State Highway 19 should attract many Canadian visitors. Because of the national significance aspect attached to this area, it is anticipated that two percent of the state's 3,000,000 visitors, or 60,000, will visit the breaks annually.

In summary, the total number of visitors who will use the breaks area for recreational purposes is estimated to be approximately 100,000 persons, after initial development. It should be noted, however, that this figure is a minimum estimate based on the first year's proposed development. Thereafter, the visitation figure will increase, especially from Zone C, as the poor accessibility is improved, the proposed developments are completed, and the breaks become known as a key recreational area.

Recommended Land Acquisition

The recreation plan for the breaks area hinges on obtaining public control of those key recreational areas which are now under private or State Land Department ownership. This can be accomplished through exchange proceedings, or purchased (if authorization will be allowed) and should be done on the following priorities:

1. Those areas which will be intensively developed.
2. Those areas which are of historic or archeological significance.
3. Those areas, especially the land immediately adjoining the river, which will be included in overnight, makeshift camping sites and extensively used for hunting and fishing.

Recommended Further Study

A considerable amount of planning remains to be done as far as recreation is concerned in the breaks area. As stated earlier, the proposed developments thus far are of an initial nature and represent the results of a very preliminary investigation. If the Bureau of Land Management is to be responsible for the river-based recreation, the following studies would be required in order to properly plan and develop the recreational resources involved.

1. Prepare master recreation site plans for the areas to be developed.
2. Complete historical, archeological, and scientific studies of the area. This information will then be included in plans for preservation and interpretation of the area.
3. Coordinate further with State Fish and Game, Highway Department, and State Recreation Department plans for road access into prime wildlife and intensive recreational development areas.

PART IV - OTHER AGENCY PROPOSALS AND THEIR EFFECT UPON THE BUREAU OF LAND MANAGEMENT'S PROPOSAL

Bureau of Reclamation and Corps of Engineers

National Park Service

Bureau of Mines and Geological Survey

Bureau of Sport Fisheries and Wildlife

PART IV - OTHER AGENCY PROPOSALS AND THEIR EFFECT UPON THE BUREAU OF LAND MANAGEMENT'S PROPOSAL

Bureau of Reclamation and Corps of Engineers

Reservoir construction proposals by these two agencies would affect only the recreation development portion of the Bureau of Land Management's proposal. The three parks, four campgrounds, and preservation of natural river bottom terrain objectives would be flooded out, all or in part, by the various proposals. However, this is recognized in Part III of the Bureau of Land Management's report, and an alternate recommendation for reservoir-based recreation advanced.

If dams are constructed in the Bureau of Land Management report study area, appropriate arrangements will have to be made for recreational development and use. Assuming that this recreation potential is not considered to be of national recreation area caliber, the Bureau of Land Management would seem the logical agency to accomplish the recreation development and management needed. The land pattern around these reservoirs, as shown on the attached map, is predominantly national land reserve, and the situation appears to be analogous to Hungry Horse Reservoir in northwestern Montana. This reservoir is entirely within a national forest, and the Forest Service is responsible for recreation management.

National Park Service

The National Park Service proposal for a "National Wilderness Waterway" is quite similar to the recreation development plan advanced in the Bureau of Land Management's report. If the area truly has national significance and the Bureau of Outdoor Recreation is charged with a special study of the Lewis and Clark trail, which will help make this determination, the Bureau of Land Management plans will be dropped where they conflict with the National Park Service proposal.

One problem of significance will occur if the Park Service proposal is adopted. On page 46, it states, "Some fencing would be required within this unit to prevent cattle and other domestic animals from drifting into the area." This area is extremely rough and a livestock-tight fence will be difficult to maintain due to erosion, spring runoff, etc. Also, domestic cattle have been watering in the river and their natural pattern of use is to water at the river and graze back up into the breaks.

Man has always had trouble trying to manage livestock in a manner against their natural habits or temperament. Fences can be constructed and maintained but there will be a constant problem of breakage and trespass by livestock. Any arrangements between the two agencies should specifically pinpoint responsibility for dealing with this problem.

Bureau of Mines and Geological Survey

These agency reports develop factual data regarding the mineral resources of each agency's respective study area. No conflict is seen with the Bureau of Land Management report. An apparent difference in statistics regarding mineral resource volumes and opinions regarding potential between these reports and the Bureau of Land Management's report, is due to the selection of different geographical study areas.

Bureau of Sport Fisheries and Wildlife

The only major conflict between proposals by the Bureau of Land Management and another agency occurs with the Bureau of Sport Fisheries and Wildlife. The basic difference appears to be the following:

(A) The Bureau of Sport Fisheries and Wildlife has identified a large area, encompassing a good share of the Bureau of Land Management study area, and has recommended that it be designated a wildlife management area. It should be managed to produce a maximum supply of wildlife with such domestic livestock production as can be accommodated under this objective. It logically follows that such management can best be exercised by the Bureau of Sport Fisheries and Wildlife. The only apparent basis for this proposal is that the Bureau of Sport Fisheries and Wildlife is charged with maximizing the nation's wildlife resource output, and this proposal would, of course, advance that objective.

(B) The Bureau of Land Management takes a position directly opposed to this. The Bureau of Land Management holds that the area in conflict, along with the west end of the Fort Peck Game Range, should produce a combination of domestic livestock and wildlife which will achieve the maximum dollar contribution to the local, state, and national economy. The exact balance is not known, but no economic study has been made to prove that it should maximize wildlife. The Bureau of Land Management contends that this type of management can be most effectively achieved by the Bureau of Land Management managing the land and forage resource, the State Fish and Game Department managing the wildlife, and private livestock operators managing the livestock. All of these entities are now managing their respective resource, and all that needs to be done is to:

(1) Make such stocking adjustments as are necessary to achieve an optimum balance between big game and livestock, based upon their respective contribution to the economy, and

(2) Provide the necessary public access, both legal and physical, to permit harvesting the wildlife resource.

It is recognized that wildlife values cannot be entirely measured in economic terms, but neither can they be measured only in esthetic terms. Since a basic reason for this entire Departmental study is to see what can be done to best utilize the resources of this geographical area, it seems that some form of economic measure is imperative.

The economic data in Part I of the Bureau of Land Management's report shows that this area is not in robust health economically. It cannot afford the type of management proposed by the Bureau of Sport Fisheries and Wildlife if this will not contribute the maximum economic benefit to the area.

In analyzing the specific recommendations of the Bureau of Sport Fisheries and Wildlife, appearing on pages 16 and 17 of their preliminary report, we strongly disagree with the first recommendation for establishment of the one million acre Missouri Breaks Wildlife Area, for the reasons spelled out above. We agree with the recommendations to develop an exploratory program for the commercial fishery, to improve hunting and fishing access, to develop small marsh areas along the river, to develop food and cover plots, and to provide directional signs. The directional signs and access development are part of the Bureau of Land Management's proposal. We have no comment on the other recommendation for construction of elevated nesting platforms.

Any further analysis of the conflict between the proposals advanced by these two agencies appears fruitless. It is not a conflict that can be resolved by objective factual analysis. Rather, it appears to be a conflict between philosophies of resource management and their effect upon local and state economies which can best be resolved at the Departmental level.

The Bureau of Sport Fisheries and Wildlife also proposed a waterfowl management facility north and east of the Bureau of Land Management study area. Due to its location outside the boundary of the Bureau of Land Management study area, an exhaustive analysis has not been possible. However, the following statistics have been compiled:

Land Ownership	Acres	AUM's (Cattle)
National Land Reserve	68,122	6,923
Fort Peck Game Range	51,074	4,212

Bureau of Land Management Permittees Involved - 18
Ranch Headquarters Included - 17

Missouri River Study - National Land Reserve - Montana

Map 1

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Missouri River Study - National Land Reserve - Montana

PROPOSED IMPROVEMENTS
Legend
Large parks complete with trailer stalls, campgrounds and picnic sites. Week-long or afternoon facilities.
Area to be retained in semi-wilderness state-on aesthetic setting of the Lewis and Clark route-for river travelers.
Small campgrounds primarily established to facilitate float trips and to provide access for fishing.
Historical or archeological sites.
Existing improved road system
Existing dirt roads to be improved
Existing trails-roads to be constructed
Proposed Land Management Area "Missouri Breaks"
Study Area Boundary
J.L.K. 1962
JUDITH
BEAR PAW DAMSITE
LEWIS AND CLARK
DAVIES
ILLIAD DAMSITE
FORT COOK
INDIAN GRAVES
WOODHAWK
JAMES KIPP
ROCKY POINT DAMSITE
BEAUCHAMP
CARROLL
FORT MUSSELSHELL
MUSSELSHELL
HILL COUNTY
CHOUTEAU COUNTY
BLAINE COUNTY
PHILLIPS COUNTY
FORT BELKNAP INDIAN RESERVATION
LEWIS AND CLARK NATIONAL FOREST
CASCADE COUNTY
CHOUTEAU COUNTY
JUDITH BASIN COUNTY
FERGUS COUNTY
PETROLEUM COUNTY
MISSOURI
RIVER
LAND OWNERSHIP STATUS
Scale: 1/4 Inch : 1 Mile
Patented
National Land Reserve
State
Powersite Withdrawal
Public Water Reserve
Indian Allotment
Acquired Under Bankhead-Jones Farm Tenant Act
LEGEND
HYDROGRAPHY
Perennial River
Perennial Stream
Intermittent Stream
Canal or Ditch
Dam
Perennial Lake or Reservoir
Intermittent Lake or Reservoir
CULTURE
School
Church
Town
Airway Beacon Light
ROADS
U.S. Highway
State Highway
County Highway
Hard Surface
Improved (Graveled and Drained)
Unimproved (Not Maintained)
RAILROAD
Single Track
BOUNDARIES
County
As Labeled
M.R.B. CARTOGRAPHIC DRAFTING SECTION DENVER COLORADO 1962

Map 2

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